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ABSTRACT

Data and issues on costs of primary, secondary, and higher education in Eastern Africa are presented. Practical recommendations for controlling or reducing costs while paying attention to effects on quality and equity are made. For each level of education the report reviews student-teacher ratios, teacher salaries, non-teaching costs, and cost-recovery. Effects of population growth on costs as well as needs for improved educational management are assessed. Estimates of possible cost savings by country in Eastern Africa are included. Eight major tables and twenty supporting tables present data and information on costs of education in Eastern Africa. Primary enrollment, teachers, and cost projections by country based on different fertility assumptions are provided. The report concludes with a bibliography. (RSL)

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Controlling the Costs of Education in Eastern Africa

A Review of Data, Issues, and Policies

Laurence Wolff

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ABSTRACT

Eastern Africa has enormous needs for investment in human resources development but limited financial resources available as well as relatively high costs compared to per capita income. This report reviews data and issues on costs of primary, secondary and higher education in Eastern Africa and makes practical recommendations for controlling or reducing these costs while paying due attention to effects on quality and equity. For each level of education the report reviews student-teacher ratios, teacher salaries, non-teaching costs, and cost-recovery. It also reviews effects of population growth on costs as well as needs for improved educational management. The report includes estimates of possible cost savings by country in Eastern Africa.

RESUME

L'investissement dans la mise en valeur des ressources humaines est un besoin crucial des pays d'Afrique de l'Est, mais les ressources financières disponibles sont restreintes et les coûts sont plus élevés par rapport au revenu par habitant. Le présent rapport examine les données et questions relatives aux coûts de l'enseignement primaire, secondaire, supérieur en Afrique de l'Est et formule des propositions qui visent à réduire les coûts en fonction de leurs effets éventuels sur la qualité et en termes d'équité. Le rapport examine également, à tous les niveaux de l'enseignement, les ratios élèves-maîtres, les salaires versés aux enseignants et les dépenses autres que les salaires versés aux enseignants, le recouvrement des dépenses, les effets de la croissance de la population sur les coûts, le besoin d'améliorer la formation des cadres. Le rapport s'efforce de trouver les moyens de réduire les coûts pour les pays d'Afrique de l'Est.

RESUMEN

Africa Oriental necesita de inversiones substantivas en el campo del desarrollo de recursos humanos. Al mismo tiempo, sus recursos financieros para este propósito son limitados y sus costos elevados en relación a su ingreso per capita. Este informe estudia datos básicos y elementos importantes que afectan la educación primaria, secundaria y superior en Africa Oriental y propone recomendaciones prácticas para controlar o reducir el gasto prestando debida atención a sus efectos sobre la equidad y calidad de la educación. Para cada nivel educacional, el informe estudia el coeficiente alumno-profesor, sueldos de los profesores, otros costos y la participación de usuarios en el financiamiento de la educación. Estudia tambien los efectos del crecimiento demográfico sobre el gasto y los requerimientos en términos de mejorar la administración financiera de la educación. El informe incluye estimaciones de posibles reducciones en el costo de la educación para los diferentes paises de la región.

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SUMMARY

1. Over the last twenty years countries in Eastern Africa have made great progress in expanding educational opportunities and meeting manpower needs. Nonetheless the region still remains at the bottom of all rankings in educational development, and shortages of trained human resources are one of the main impediments to renewed economic and social development. Despite these needs, slow economic growth will limit the amount of funds available for education and relatively high education costs compared to per capita income will make educational expansion difficult. It is therefore essential for countries in the region to ensure that their limited funds have a maximum impact, that the efficiency of education systems is increased, and that new sources of education financing are made available. To assist in this process, this report reviews, in a comparative framework, data, issues and policies which might lead to greater cost-efficiency and better use of available funds. The report is designed to provide broad guidelines only, since the implementation of specific policies depends on detailed country analysis.

Primary Education Costs

2. The unit costs of primary education in Eastern Africa average US$71 equivalent (1978-1982 data). As a percentage of GNP per capita (a better measure of the "burden" of education costs) they vary from 3% to 63%, with an average of 16%. The major elements which influence primary school unit costs are student-teacher ratios and salaries paid to teachers. In the region as a whole student-teacher ratios average 41:1 and vary from 22:1 to 63:1. There is research evidence available which suggests that within certain limits lower class size does not necessarily result in greater student achievement and the evidence in Eastern Africa appears no different. It may therefore be appropriate for countries with relatively low student-teacher ratios to consider raising these ratios modestly as a means of reducing unit costs. Other cost saving measures which might be considered include eliminating or reducing the number of specialized teachers and non-teaching headmasters in primary schools; requiring that teachers are trained at the upper secondary rather than post-secondary levels; and upgrading untrained teachers through vacation and correspondence courses rather than through formal residential programs.

3. Teacher salaries average US$1,859 per year (1978-82 data). Salaries as a ratio of GNP per capita range from 1:1 to 10:1 and average 5:1 and as a ratio of manufacturing salaries average 1.2:1. Based on all these data, it appears that some countries may be paying a premium to teachers in comparison with their available resources, and it will be very difficult for these countries to continue to expand their education sytem while maintaining relative salary levels. On the other hand some countries have combined relatively low teacher salaries with equally low student-teacher ratios and it might be appropriate to increase both elements. Any proposed changes in teacher salaries mut take into account relationships to civil service and other salaries, possible adjustments in annual salary increments, salary differentials based on level of training, possible recruitment of teachers with lower levels of qualifications, and the effects of all these measures on teacher morale and teacher recruitment.

4. Historically communities and parents in Eastern Africa have paid much of the costs of primary education. Over the last thirty years governments have gradually taken on a higher share of these costs. However governments no longer can continue on this path, and it may be necessary to return to a system of cost sharing by the community, to allow governments to provide services to those it was previously unable to reach or to improve the quality of its services.

5. Teacher salaries generally account for 85-99% of costs to governments. Some countries devote significant portions of their budgets to financing textbooks, operating expenses, feeding, and administration. Information is scanty on community, student, and family costs for primary education. Among the countries for which information is available, school fees range from 0 to about 30% of total unit costs. Parents spend a significant amount per year for uniforms, books, pencils, paper, transportation, food, and school construction. These non-fee costs may adversely affect school attendance among poorer and rural families.

6. Based on the above information some governments may consider cutting back on their support of certain non-teacher salary items, provided quality is not adversely affected. In order to minimize the possible detrimental effects of such cutbacks, assistance could be provided to ensure that textbooks are rented at the lowest possible cost, that headmasters are trained in the management of school funds, and that self-help construction is done in the most cost-efficient manner. Fees at the primary level could be used as "enforced quality improvement measures", e.g. to provide textbooks, or to implement specific policies such as restricting the number of students repeating the final year of primary schooling, but significant increases in fees will more than likely have adverse effects on school attendance.

7. It is possible to undertake an exercise to estimate unit cost savings assuming certain policies are adopted. For example if student-teacher ratios were increased to 40:1, teacher salaries restricted to no higher than a 5:1 ratio to GNP per capita, and government support of non-teacher salary items restricted to no more than 10% of total costs, then on average unit costs to Governments in Eastern Africa could be reduced by 23% with a range of savings between 10 and 60%. For some countries it might be appropriate to lower student-teacher ratios or increase teacher salaries with resulting increases in unit costs. An alternative is to trade off savings in one area of education for expenditures in areas with greater possible returns in terms of student achievement. For instance it might be possible to utilize savings in teacher costs for support of textbook, school library or school radio programs which have been shown to improve student achievement significantly. Whether any of these policies is appropriate to a specific country can only be determined through in-depth country analyses.

8. All governments in the region are committed to achieving universal primary education (UPE) in the shortest possible time. About half the countries already enroll 90% or more of primary age children, but enrollment ratios in other countries in the region are as low as 30%. The achievement of UPE by these countries will therefore be very difficult given present financial stringencies. The problem is compounded by high rates of population growth. Implementation of programs to reduce population growth would reduce the size of the school age population, and in most cases the resulting savings would dwarf the possible savings in unit costs described above.

9. Another measure of unit costs is that of the cost to produce one graduate. In Eastern Africa high drop out and repetition rates result in very high costs per graduate compared to the theoretical costs if all children proceeded smoothly through the system. Efforts to improve the flow of students through the system could include establishing regulations to reduce the number of times a child could sit for the primary school completion examination, improving examination systems, improving teacher quality, producing adequate textbooks, and reforming curriculum.

Secondary Education Costs

10. Unit costs at the secondary education level average US$340 equivalent and as a percentage of GNP per capita average 85%. Secondary education unit costs average seven times primary education costs. As enrollment increases, unit costs tend to decline, mainly because of reduced boarding and lower teacher salaries.

11. The average student-teacher ratio in secondary education is 22:1, and the range is from 13:1 to 41:1. This figure masks differences between lower and upper secondary education in a number of countries which have differentiated curriculum and enrollment levels between these two levels. It is possible to increase student-teacher ratios to 24:1 through increasing the number or length of teacher contact hours per week or through increasing the number of students per class. In order to implement such changes, governments would have to establish and enforce guidelines on teacher hiring and utilization practices. The introduction of technical and vocational subjects into the general secondary education curriculum increases capital costs and recurrent costs significantly. It is therefore appropriate to scrutinize very carefully the value of this curriculum reform to determine whether the additional cost can be justified. In most countries secondary teachers are trained both in post-secondary non-university "diploma" level courses and in university level degree granting courses. Costs of university level training are two to fifteen times the cost of non-university diploma level training.

12. Teacher salaries average US$4,400, and as a ratio of GNP per capita average 11:1 and range from 2:1 to 26:1. In some countries teachers may be paid a premium for their services which will make it

difficult to expand enrollment. On the other hand, some countries seem to be paying teachers very low salaries which may result in low morale and recruitment problems.

13. Several governments require that before students enter the university they complete a period of national service as junior secondary school teachers. This has the effect of reducing teacher costs, but to be effective it must be accompanied by adequate pedagogical training and supervision. In addition, the hiring of more "diploma" level rather than degree level teachers would significantly lower the salary bill; this would also require good training and careful supervision. It may also be appropriate to review annual step increases and salary differentials to determine what if any savings can be made without significant morale or recruitment problems.

14. Expenditures other than teacher salaries make up on average 35% of total governmental expenditures on secondary education and range from less than 1% to over 50% of total costs. On average provision of boarding doubles both construction and running costs. Countries with large boarding enrollments should begin now to gradually switch to a day school system through streamlining curriculum, establishing minimum catchment areas for day schools, and providing for local rather than national assignment of students. Day schools are also conducive to the establishment of double shifting, which should be introduced to urban and some densely populated rural areas as a means of reducing capital investment costs.

15. Governments in the region cover varying levels of school operational costs, maintenance, equipment, textbooks and teaching aids. In many countries this assistance is inadequate and individual schools require fees and/or donations from parents ranging from a few dollars to over US$200 equivalent. It is appropriate for governments to cover a portion of non-teaching costs, since the proper operation of a secondary school requires adequate equipment and teaching aids. However, a portion of these costs, especially those for textbooks and boarding, should be devolved to students.

16. In most of Eastern Africa there is "excess demand" for a limited number of secondary school places and students and parents are apparently willing to make great financial sacrifices to ensure attendance in secondary schools. Kenya is probably the country in which the highest percentage of costs are borne by students, parents and the community, but enrollment in secondary education is a high 19% of the school age population. Costs borne by students in public institutions account for as much as 50% of total costs and enrollment in purely private (non-government aided) institutions is as much as 37% of total enrollment.

17. Based on the facts above most countries should be able to mobilize additional community, student, and parent-financed resources for secondary education. The exact form of such mobilization would vary from

country to country, and might include shifting the costs of boarding and textbooks to students, as well as putting aside a significant portion of all school fees for provision of scholarships to needy students. The development of private schools could be encouraged through setting up appropriate rules, regulations, and inspection systems.

18. As in the case of primary education, it is possible to undertake a cost reduction exercise for secondary education. If the following policies are implemented --(a) an increase in the student-teacher ratio to 24:1; (b) government financing of no more than 80% of total public school costs; and (c) restriction of teacher salaries to no more than twelve times GNP per capita-- then every country surveyed could make savings in unit costs varying from 13 to 79% and averaging 38%. Overall the possible cost savings in secondary education are much higher than in primary education.

19. A way of increasing access to secondary education at a relatively low cost is to strengthen non-traditional correspondence or radio schools. Research has shown that such institutions in Lesotho and Malawi are lower cost alternatives to traditional education and other countries could profit from the experience.

20. It is difficult to establish an "appropriate" or adequate enrollment ratio in secondary education. The region as a whole has the world's lowest secondary enrollment ratios and in general it would not be wise to restrict enrollment growth at this level.

Higher Education Costs

21. The unit costs of higher education in Eastern Africa average US$4,100 and range from US$895 to US$11,081. This figure is equivalent to 10.4 times per capita income, which is higher than all other regions in the world, and is more than 50 times average primary school costs in Eastern Africa. It is therefore especially urgent to review costs at this level. In some countries it may be worthwhile to shift a portion of higher education costs to lower education levels, especially when primary enrollment ratios are low.

22. Student-teacher ratios in Eastern Africa average 7.4:1. Ethiopia is the only country with a ratio higher than 10:1; the lowest ratios are in Tanzania, Sudan, and Zambia (less than 5.5:1). These ratios are significantly lower than in the rest of the world. The reason appears to be that higher education institutions in Eastern Africa, most of which are relatively small, have developed the full spectrum of subjects and specializations, with the result that enrollments per course, especially in third and fourth years of study, are very low. It is appropriate to review needs for these programs to determine whether some should be phased out and others expanded to reach minimum levels of enrollment necessary for both quality instruction and lower costs. Other possible cost saving measures would be to increase teaching demands on staff members who are not

heavily involved in research and to expand specialized post-secondary institutions, most of which have lower teaching costs than full scale national universities.

23. Non-teaching costs of higher education in Eastern Africa average 60% of total costs of higher education. This is a result of provision of full dormitory, boarding, and staff housing facilities, as well as relatively higher costs for administration, equipment, and library books. A review of these costs in one country resulted in proposals for cost-reduction equivalent to 16% of total higher education costs and a similar review elsewhere resulted in recommended savings of 5.6%. Among the various proposals made are: encouraging off-campus living; gradually devolving responsibility for finding housing to staff; privatizing food and other services; reducing transportation costs; lowering salaries paid to staff while being trained abroad; charging full costs for services provided by universities; closing down institutes which may not be serving a useful function; and utilizing existing physical facilities more efficiently through longer teaching hours and computerized scheduling. Adequate libraries, equipment, and maintenance are essential for quality instruction and therefore these should usually be the last areas for cost reductions.

24. Governments in Eastern Africa cover nearly the full cost of higher education and usually provide stipends to students for costs of books and incidental expenses. This policy made sense at the time of independence because of urgent needs to educate a core of nationals to run the machinery of government. However civil service employment has now expanded rapidly and graduates in several countries are having difficulty finding public sector employment. In addition it has been argued that the private rate of return to higher education graduate is very high and that free higher education in effect amounts to a subsidy of the privileged elements of society by more needy elements. Over the long run it is appropriate, therefore, to consider eliminating student stipends and gradually charging the full cost of room and boarding. However such policies would have to be accompanied by programs of scholarships and loan schemes for the needy. Loan schemes, which have already been adopted in several countries, need to be carefully managed and enforced to be successful.

25. Based on a cost-reduction exercise using available data, on average higher education institutions could reduce unit costs by more than 25% through increasing student-teacher ratios to 12:1 and reducing room and boarding costs by one half. Such policies, however, would have to be based on careful review of the issues on a country by country basis and could be implemented only gradually. Information on higher education salaries was not available.

26. In nearly all countries in Eastern Africa, further expansion of higher education is essential for national economic development. However to strengthen the role of higher education in development, it will be necessary to periodically review all programs and to expand or contract

them in accordance with national needs. It may also be necessary to strengthen students' entrepreneurial and creative skills as a means of encouraging job creation in the private sector. In addition establishment of cooperative programs with institutions in neighboring countries may be an important means of providing qualitatively superior and cost effective programs.

Management of Education Systems

27. It is necessary to establish a process to successfully identify and implement policies to control costs. This process requires better data and information which, with the advent of the micro-computer, can now be provided with relative ease. In addition, computer programs are now available to project costs under different sets of assumptions. Presentation of financial data in budget documents can also be improved.

28. Planning offices in education are usually overwhelmed with day-to-day problems and require more and better staffing and training. Administrative and accounting offices need practice in establishing and enforcing system-wide regulations. Headmasters and school supervisors also need training in financial and personnel management. Overall ministries of education should be organized so as to provide a new form of "technical assistance" to local communities and headmasters.

29. A more systematic framework, including formal review sessions by ministers of education and finance, is needed for review of education budgets, especially those of autonomous institutions such as universities, institutes of education and testing agencies. Policy decisions on costs need to be clearly set out and then rigorously enforced at both the local and national levels.

I. INTRODUCTION

The Need for Investment in Education in Eastern Africa

1.01 From 1970 to the early 1980's, countries in the Eastern Africa region [1]/ made great progress in expanding educational opportunities and in meeting manpower needs. Primary school enrollment ratios increased from about 55% to 74% of the primary school age population (Annex I, T-1). Enrollment ratios in secondary education increased from 8 to 15% of the relevant school age population, and in higher education increased from 0.7 to 1.1% of the relevant population age group. Despite this major effort, the region is still at the bottom of all rankings in educational development. Eastern Africa's need to invest in human resources has been documented many times. One World Bank report puts it this way: "Faster economic growth in Africa requires accelerated development of human resources. This involves more and better formal schooling and intensified training. There is agreement among African and other experts that school systems must be expanded and improved, especially at the primary level. ... Secondary education should also be substantially extended. ... While university education has spread rapidly in the last two decades there are numerous places where the output of university graduates is still far short of demand. ... A review of economic returns to educational investment has shown the returns to be substantial (pp. 81-82)". [2]/

The Need for Cost Savings in Eastern Africa

1.02 Governments in the region have continued to make major efforts to increase their support of education. The percentage of overall government recurrent expenditures devoted to education and training in both 1970 and 1980 was 18% (Annex I, T-2), and in most countries education accounted for the highest percentage of the recurrent budget. This percentage varied from about 11% in Ethiopia, Somalia, Djibouti, and Malawi to over 21% in Comoros, Madagascar, Kenya, Swaziland, and Rwanda. At the same time, the percentage of GNP devoted to education averaged 4.6% in 1980, a figure which has increased significantly from 4.2% in 1970 (Annex I, T-3).

1.03 Despite its acknowledged gains, Eastern Africa is facing a dilemma. Long term investment in human resources is essential for economic and social development. However, slow economic growth over the next 5-10 years will limit seriously the amount of funds available for the public sector, and it is likely that there will be little scope for increasing the share of government budgets devoted to education and training. Furthermore, continued and rapid population growth will require real increases in budgets of 4-5% per year merely to maintain present enrollment ratios. To meet their goals, countries in the region must ensure that their education systems are efficiently managed, that their limited funds have a maximum impact and that sources of education financing other than

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1/ These are the twenty member countries of the World Bank served by the Eastern Africa Regional Office.

2/ See Accelerated Development in Sub-Saharan Africa: An Agenda for Action. (Washington, DC: The World Bank, 1981).

the government budget are available. Greater cost-efficiency and cost-recovery will assist governments to continue to expand enrollment and at the same time to retain or improve quality. The alternative is stark: stagnating enrollment or expansion with greatly diluted quality, resulting in long term deterioration in Eastern Africa's human resources.

1.04 The effort required to make education systems more cost-efficient is part of an overall effort needed in Africa to ensure economic development, and education is neither more nor less efficient than other sectors. However, the need is particularly crucial in this sector because of its large share of national budgets as well as because of crucial long term needs for manpower development, which can only be met through expansion and quality improvement of education. In addition, as seen below, the unit costs of education in Eastern Africa as a percentage of GNP per capita are higher than all other regions with the exception of francophone Africa. Only through significant reductions in the burden of these costs can goals for expansion and improvement of education be achieved.

Table 1: UNIT COSTS OF PUBLIC EDUCATION AT THE VARIOUS LEVELS AS A PERCENTAGE OF GNP PER CAPITA

Region	Percent		
	Primary	Secondary	Higher
Eastern Africa	16	85	1040
Francophone Africa	29	143	804
South East Asia and Pacific	11	20	118
South Asia	8	18	119
Latin America	9	26	88
All Developing Countries	14	41	370
Advanced Countries	22	24	49

Source: For Eastern Africa, Annex I, T-5 and T-19. For other regions, World Bank data.

The Purpose of this Report

1.05 This report reviews comparative data, policies, and practices and makes proposals for increased cost-efficiency in primary and secondary education. Its purpose is not to make conclusive country by country recommendations, since these can only be made after further country specific analysis. Nonetheless a comparative analysis serves the important purpose of highlighting issues and problems which may then be studied further. The report is therefore designed to provide a springboard for

further country-based policy analysis and discussion on cost-efficiency of education systems. This report focusses on the formal education system and does not cover training and non-formal education, which usually take place outside ministries of education. In general the report does not cover issues of the relevance of education to country needs, which is a cost-effectiveness issue in the widest sense. Wherever possible, the report considers proposed cost saving measures in terms of their possible effects on quality and equity. These relationships are very complex but policy decisions on educational costs must be taken in cognizance of these effects. This report should be read in conjunction with a number of World Bank reports, which are listed in Annex 3. This report is not meant to be a prescription for reducing the amount of public funds allocated to education. As noted above additional investment in education is essential for economic and social development. Some countries may well need to increase their allocations to education, while other countries may need to re-allocate savings made in one educational sub-sector to other higher priority educational levels or programs. Such decisions need to be taken in the perspective of coherent sets of country policy objectives.

The Data and Information Presented

1.06 Seven countries completed a questionnaire prepared by World Bank staff on financing of education. However, for the most part this report relies on data from World Bank appraisal and sector reports and from the Unesco Statistical Yearbook. The data in Bank reports were gathered by Bank staff during the course of their missions over the last five years. The Unesco Statistical Yearbook compiles information prepared by individual governments according to Unesco guidelines. Each government follows its own practice of defining categories, and World Bank and Unesco documents do not fully reconcile these differences.

1.07 To a great extent it is misleading to compare unit costs or teachers salaries in very poor countries such as Somalia and Burundi with costs or salaries in relatively well developed countries such as Zimbabwe and Mauritius. In the first place, the nature of the labor market and the system of wage remuneration may vary significantly. In addition, exchange rates may be unrealistic and in fact have fluctuated significantly in recent years. World Bank sponsored research on "Purchasing Power Parities" has been underway for some time and in the three African countries studied --Kenya, Malawi, and Zambia-- the research shows in 1975 that GDP per capita is significantly higher when using Purchasing Power Parity Exchange rates rather than official exchange rates 3/. However, the research is incomplete and there is still no viable alternative to using official exchange rates. Inter-country comparisons, including those using ratios of costs or salaries to GNP per capita, should therefore be used to point out key issues and place countries in a framework for further analysis rather than for reaching definitive conclusions.

3/ See 1983 World Bank Atlas, p. 27, and Irving B. Kravis, et. al. Phase III: World Product and Income: International Comparison of Real Gross Product (Baltimore and London. The John Hopkins University Press, 1982).

1.08 This report is also based on informal observations and analyses, including conversations with Government and Bank officials, direct observation of schools and of school systems management, and review of World Bank research papers, appraisal reports, and sector reports. It is hoped that readers of this report will compare their own experiences with those cited in this report to ensure the validity of the recommendations made.

II. ISSUES IN PRIMARY EDUCATION COSTS

Unit Costs

2.01 The unit costs of primary education in Eastern Africa vary greatly (Annex I, T-4). In primary education the highest unit costs, all above US$100 equivalent, are those of Djibouti, Botswana, Zimbabwe, and Mauritius. Except for Djibouti, whose high unit costs are a result of a cost structure tied to Middle Eastern and French levels, these countries are also among those with the highest per capita income. The lowest unit costs (less than US$13) are those of Malawi and Uganda. In terms of relationships of primary education unit costs to GNP per capita (Annex I, T-5)), Djibouti (63%), Burundi (23%), Botswana (20%), Ethiopia (19%), and Comoros (18%) have the highest costs. The countries with the lowest unit costs in relation to GNP per capita are Uganda (3%), Malawi (6%), Lesotho (7%), and Swaziland (9%).

2.02 The two major elements affecting primary school unit costs are student-teacher ratios and salaries paid to teachers. In only a few countries do non-teacher costs constitute a significant component of primary school costs. The following sections review teacher utilization and training, teacher salaries, and non-teacher costs, and make proposals for policy changes based on available data and information.

Primary School Teachers

2.03 On the whole student-teacher ratios in primary education have declined from an average of 43:1 in 1970 to 41:1 in the 1978-82 period (Annex I, T-6). During this period Madagascar, Sudan, and Mauritius have reduced student-teacher ratios significantly, while Malawi, Ethiopia, and Kenya have raised student-teacher ratios considerably. Countries which have relatively low student-teacher ratios are Mauritius (22:1), Somalia (29:1), Botswana (32:1), Sudan, Swaziland and Uganda (34:1). The countries with the highest student-teacher ratios are Malawi (65:1) and Ethiopia (65:1).

2.04 Traditionally both educators and the general public have believed that low student-teacher ratios result in higher achievement. However, a review of research studies has reported that "on the basis of available data no optimum class size can be scientifically established as a function of educational benefits" 4/. The review concludes that how teacher

4/ Wadi Haddad, "Educational Effects of Class Size", World Bank Staff Working Paper No. 280, 1978.

organizes the class is more important than class size and that savings made from increased class size might be invested in teacher training or educational materials, which have been shown to have stronger effects on student achievement.

2.05 Experience in Eastern Africa seems to corroborate the finding of no clear-cut pattern in the relationship between class size and internal efficiency. For example, the correlation coefficient (r^2) between student-teacher ratios and the percentage of students who complete primary education in countries in Eastern Africa is a low .1. Specifically Somalia has had a policy of hiring all graduates of teacher training colleges, which has resulted in over-production of teachers hoping to get on the civil service payroll, and the low student-teacher ratio has apparently not improved internal efficiency (only 26% of entering students complete primary school). In Mauritius, the low teacher-student ratio is to a great extent a result of a policy of providing specialized language teachers (Hindi, Urdu, Mandarin, etc.) in each school. These teachers teach only a few students at a time and therefore have little or no effect on achievement in the regular school subjects. In three other countries with relatively low student-teacher ratios --Swaziland, Sudan, and Uganda-- about 60% of entering students completed the primary course, which is slightly above the average of 56% for the region as a whole. On the other hand, Botswana, with a low student-teacher ratio, is a country with a very high percentage of primary school completers. In the absence of any conclusive findings, a number of countries might consider raising student-teacher ratios as a means of reducing costs. In particular, Somalia, Uganda and Sudan, with low enrollment ratios as well as low per capita income, will be able to expand education significantly only through raising their student-teacher ratios.

2.06 At a certain point classroom management and organizational problems become difficult when a teacher has to handle very large numbers of students. Therefore, Ethiopia, with a student-teacher ratio of 59:1, and Malawi, with a ratio of 65:1, may have student-teacher ratios which are too high to ensure that children learn adequately. As a short term policy, these two countries might strengthen their teacher-training programs to include methods of teaching large class sizes, such as small group instruction, student leaders, and double shifting. Over the long run they might consider gradually reducing the student-teacher ratio to more manageable averages.

2.07 National student-teacher ratios may hide an equally important issue, that of equitable distribution of teachers. Some densely populated urban or rural areas may have student-teacher ratios which deviate widely from national averages; and decisions may be needed on how to smooth out these variations.

2.08 In most of Eastern Africa primary school teachers are trained at the upper secondary level. In Mauritius, Malawi, Kenya, Somalia, and Zimbabwe, among other countries, primary teacher training is also offered at the post-secondary level. While this policy may be appropriate for Mauritius, Kenya, and Zimbabwe, where secondary enrollments are high, countries such as Malawi and Somalia might consider reducing output from this level. As many as one third of the primary teaching force in some

countries are untrained, and many have no more than a primary education. These teachers can be upgraded through combinations of vacation and correspondence courses, often at lower costs and with results similar to those of the regular pre-entry course. This approach has the added value of utilizing those who are already committed to teaching, since the aspirations of graduates of teacher training colleges are often such that they do not enter the profession. As another means of lowering teacher costs, it would be appropriate to reconsider policies of providing specialized primary school teachers in areas such as home economics, industrial arts, language and/or agriculture, which are in force in Botswana, Swaziland, and Mauritius, as well as the policy, in these countries and in Zimbabwe, of including a non-teaching headmaster in all schools.

Teacher Salaries

2.09 The countries with the highest teacher salaries in the region are Zimbabwe (US$4725 equivalent), Botswana (US$4291), Zambia (US$3183), and Swaziland (US$2332) (Annex I, T-7). The countries with the lowest salaries are Uganda (US$185), Somalia (US$466), Malawi(US$797), and Tanzania (US$851). Uganda's especially low salaries in dollar terms are a result of high domestic inflation, devaluation of the currency, and the deterioration of government finances and services, and can be expected to increase over the next few years.

2.10 The ratio of salaries to GNP per capita averages 4.6:1. The countries paying teachers the most in comparison with GNP per capita are Ethiopia (10 times GNP per capita), Burundi (8.5), and Comoros (7.3). Ethiopia's per capita income of US$140 is so low that it distorts somewhat the significance of the ratio of teachers salaries to GNP per capita. In addition Ethiopia teachers face an average class size of 59:1. However, the ratios in Burundi and Comoros are much higher than those of countries with similar GNPs per capita, such as Rwanda, Malawi, Somalia, and Tanzania, and these two countries should consider restricting future salary increases. Since Burundi enrolls only 29% of the school age population, and Ethiopia only 38%, their relatively high teacher costs make it very difficult to significantly expand primary education. Just below these ratios, Zimbabwe, Botswana, and Zambia pay teachers salaries equivalent to about 5.5 times GNP per capita. Since their GNPs per capita are also relatively high, teachers in these countries also receive high absolute salaries. This may in part be a reflection of the influence of even higher salaries in neighboring South Africa. These countries should review carefully the level of teachers salaries, since it may be necessary to keep increases below the rate of inflation so as to ensure availability of funds for other social programs.

2.11 Another way of determining whether teachers are relatively overpaid or underpaid is to compare their salaries with average wages in the private sector. These data are often difficult to gather. Annex I, T-8 compares average manufacturing salaries in ten countries where data are available with average teacher salaries. Primary teacher salaries vary from .7 to 1.6 of average manufacturing salaries, with an average ratio of 1.2. The countries with the highest ratios are Burundi, Ethiopia,

Zambia, and Zimbabwe. With the exception of Mauritius the countries with high ratios to manufacturing salaries also have high ratios to GNP per capita (see Annex I, T-9).

2.12 The three countries which pay primary school teachers least in comparison to GNP per capita are Uganda (0.8 times GNP per capita), Somalia (1.7), and Mauritius (1.6). Each have low student-teacher ratios (Uganda 34:1, Somalia 29:1, Mauritius 22:1). Demands on teachers in all three of these countries have apparently been reduced as salaries have been lowered and the result may have been a lowering of teacher morale and esprit de corps.

2.13 Any policy on teacher salaries must take into account the relative abundance or scarcity of teachers as well as alternative employment possibilities. In addition, overall civil service salaries are reported to have decreased in real terms over the last 5-7 years in many countries, and further decreases may have detrimental effects. Analysis of teacher salaries should also take into account organization and remuneration of teaching service to ensure that the salary system acts as an incentive to improve teaching. Length of time between salary steps, salary differentials between steps, differentials between untrained, partially trained, and fully trained teachers, and incentives for teaching in rural or isolated areas could be reviewed. To encourage continuation in the profession, initial salaries could be kept relatively low and financial incentives provided for career advancement and additional training. When there are difficulties recruiting new teachers, it may be appropriate to provide stipends for attendance at teacher training colleges as a means of encouraging entry into the profession, as is already done in a number of countries in the region. Overall there is a need for more systematic country data and analysis on teachers' salaries.

Cost Recovery and Costs Other than Teachers' Salaries

2.14 Historically communities and parents in Eastern Africa have paid high percentages of the costs of education. Before independence, primary level education was almost exclusively the responsibility of the community or of local church groups which selected and paid teachers. Parents and students were asked to contribute funds as well as labor for teaching materials, maintenance, equipment, furniture, school operations and school construction.

2.15 In the last thirty years, African governments have gradually taken on a higher share of the financing of education. However it is now apparent that the governments do not have the capacity to fully finance educational services. Because of this shortage of financial resources, it is necessary to review the possibility of passing back to communities and parents a portion of the financial responsibility for schooling, either through recovery of costs by means of fees or through cost sharing in which the student or parent pays directly for items such as books and school running expenses. Cost sharing and cost recovery allow a government to extend its financial resources further so as to improve quality or more likely so as to provide services to those which it did not previously serve.

2.16 Information on primary school fees is available for about twelve countries (Annex I, T-11). Among these countries fees in Malawi and Uganda are highest, compared to government costs-- 37% in Malawi and 27% in Uganda. Botswana, Burundi, Somalia, and Tanzania charge no fees at the primary level; Lesotho and Swaziland charge moderate local fees, usually for school maintenance, equipment, and materials; Kenya and Zambia have official no- fee policies, but on their own primary schools have began to charge fees for quality improvement.

2.17 Information on other private costs for primary education is very scarce. A study on primary education costs in Malawi showed that while school fees were US$5 equivalent per year, the total private costs of attending primary school were about US$41, including US$4 for teaching materials (e.g. pencils, notebooks, paper); US$9 for uniforms and shoes; US$5 for transport; and US$18 for food and other incidentals (caution fee, school entertainment, school construction).

2.18 In Malawi the fees mandated by the Government vary from US$3 to US$6 and are higher in urban areas and in the first years of primary schooling. These fees are utilized solely for purchase of teaching materials, especially books, as well as for furniture, equipment, and miscellaneous administrative expenses. This means that parents are aware their fees are returned to them in the form of higher quality schooling. In Malawi it has therefore been suggested that the requirements for uniforms and shoes should be reviewed and ways sought to reduce their costs. In addition school fees might be selectively increased to implement specific policies. For example fees could be increased in urban areas, where parents are more able to afford school costs, with a portion of the funds used for quality improvement in rural areas, or could be increased for students who repeat the final year of primary schooling as a means of getting higher examination scores for secondary school entrance.

2.19 The private costs of attending school in Eastern Africa are similar to those in Malawi. For example, the cost of uniforms and shoes is estimated at US$15 in Botswana, at US$40 in Zambia, and at US$10-15 in Somalia. Books and materials are also estimated at US$ 1 in Burundi, US$10 in Somalia and US$30 in Zambia. In addition the costs of construction, which are still largely a local or district responsibility, can be calculated. In Kenya, they are estimated at about US$21 equivalent per year and in Lesotho and Malawi they are estimated at $15 to $20 per year. Therefore it is clear that the overall costs of attending school in Eastern Africa are significant. They may average as much as 20% of per capita income and therefore may be a severe burden on poorer families with large numbers of children. Fees usually cover only a small portion of these costs.

2.20 All Eastern Africa governments cover the full costs of public primary teacher salaries and the vast majority of primary schools are public. However, government support of non-teacher salary items varies from country to country (Annex I, T-10). In Burundi, Lesotho, Madagascar, Malawi, Swaziland, and Uganda, teacher salaries account for more than 95% of their primary education budgets. In contrast, Tanzania (42%), Somalia (40%), Mauritius (34%), Djibouti (16%), Botswana (15%), Zambia (11%), and

Zimbabwe (11%) devote much of their budget to non-teacher salary items such as textbooks (most of the above countries), school operation (Zimbabwe, Zambia, and Mauritius), school feeding (Kenya and Somalia), and administration (Mauritius).

2.21 As noted above, governments in Eastern Africa are now finding it difficult to continue their policy of increased financing of non-teacher salary expenditures. Provision of textbooks is an example of the problems facing governments in the region. Tanzania, Rwanda, Ethiopia, and Comoros, which have policies of providing free textbooks, are finding it difficult to provide the necessary funds for full textbook programs and the result is severe textbook shortages in the classroom especially in rural areas.

2.22 With all this information in place, it is appropriate to consider a number of policy options. In the first place governments which have covered all or nearly all non-teaching costs need to review their policies in the light of financial constraints, and consider cutting back on these supports. This would include the policies in Somalia and Kenya of providing school feeding programs, in Zimbabwe, Zambia, and Mauritius of financing primary school operational budgets and in other countries of financing school construction. A number of governments may also need to review their policies of providing free textbooks to students. However research has shown that availability of textbooks is an important factor in improving student achievement. If asking students to purchase or rent them results in a significant lessening of their usage, then it may well be better to continue to provide free or subsidized textbooks and to make savings in the more politically difficult areas of student-teacher salaries (see also para. 2.32).

2.23 In order to minimize the burden on parents of paying for textbooks governments could ask parents to rent textbooks, could establish standard bulk procurement, shipping, and distribution procedures, and could encourage schools to store textbooks adequately for protection against the weather and insect damage. They could also reduce physical features of textbooks, such as cover and paper stock, binding, and colors to a minimum level, and could establish regulations and train headmasters on the management of textbook fees at the local and district level. The governments of francophone countries in particular should pay close attention to physical quality of textbooks, since imported French language textbooks have been found to be expensive.

2.24 Governments can take similar action in self-help construction by reducing their direct financial assistance and providing appropriate technical assistance to communities to ensure that buildings are durably and timely constructed. They can assist in cost saving measures such as bulk procurement of standardized equipment and furniture, and establish programs to train school administrators in the proper management of school funds. Where needed, various donor agencies would likely provide technical assistance to develop this training capacity at the national level.

2.25 Although information is scanty, a modest level of fees may not be a major disincentive to primary school attendance, especially since most costs of attending school are not fee related. This means that Governments will need to continue to pay the full costs of teachers salaries but could

consider using fees as "enforced" quality improvement measures, as in the case of Malawi, with the results visible to both children and parents. The level of such fees could be varied to meet national policy objectives such as reducing repetition in the final year of primary education and expanding access in under privileged areas. Governments will also need to oversee the various fees and charges required by individual schools to ensure that they are efficiently managed and that collection costs are kept to a minimum.

A Cost-Reduction Exercise

2.26 Based on the data and information presented above, it is possible to undertake an exercise which estimates unit cost savings if certain policies are adopted. Such an exercise must be considered illustrative only, since country policies can be defined only in the context of detailed analysis of country issues.

2.27 The exercise is based on three possible policy options. The first policy option would be to increase the average student-teacher ratio to 40:1. There is no special magic in this particular ratio, and it is equally important to establish policies on maximum and minimum averages by country regions. Nonetheless, many educators consider a 40:1 ratio acceptable, and World Bank financed primary level projects usually are designed with average student-teacher ratios equal to or higher than this figure. Based on available data, seven countries in Eastern Africa (Botswana, Burundi, Mauritius, Somalia, Swaziland, Uganda, and Zimbabwe) have student-teacher ratios below 40:1. According to the exercise (see below) these countries could reduce their unit costs by 7 to 48% by increasing their average ratios to this level.

2.28 The second policy option would be to set the average teacher salary at no more than five times GNP per capita. There is also no magic in the ratio, and, if data were available, it would probably be better to use a ratio to average manufacturing or other private sector salaries. Nonetheless a 5:1 ratio to GNP per capita does seem adequate to attract and hold teachers in the profession. Six countries-- Ethiopia, Burundi, Comoros, Botswana, Zimbabwe, and Zambia-- have ratios higher than 5:1 and theoretically they could reduce unit costs by 8 to 40%, if they implemented this policy. Of course, salary levels would have to take into account the relative scarcity of trained manpower as well as wage policy in other sectors and in the civil service. The implementation of such a policy would require further analysis and could only be implemented gradually. In addition, teachers' salaries are usually tied to civil servant salaries and these groups constitute a very strong pressure group.

2.29 The third policy option would be to reduce expenditures for non-teacher salary items to no more than 10% of total government recurrent expenditures on primary education. This assumes that governments would continue to play a vital role in improving primary school quality through in-service training, local technical assistance, supervision, and provision of essential teaching aids, but support for these programs should not amount to more than 10% of total costs. Students, parents, and the community would cover most costs of school construction and school maintenance. Governments would continue to pay the full costs of teachers' salaries and at least a portion of teaching materials and textbooks.

2.30 Only six countries (Tanzania, Mauritius, Somalia, Botswana, Zimbabwe, and Kenya) meet the criterion for the third option. Depending on the country, this might involve cutting back on textbooks, school feeding, school administration, and school operations costs. Savings would be from 3 to 38% depending on the country.

2.31 Table 2 summarizes the results of this exercise. With the exception of Lesotho, Malawi, and Rwanda, all countries in Eastern Africa qualify for implementation of one or more of these proposed policies. Savings of more than 30% in unit costs could be made by Mauritius, Somalia, avings of 9-28% could be made by Botswana, Comoros, Djibouti, Kenya, Swaziland, Uganda, scope for possible cost-reductions in Eastern Africa. The next step naturally should be the detailed country by country analysis necessary to develop firmly grounded policy decisions rather than the generalized approach taken here. The exercise would be incomplete without looking at needs for possible increases in unit costs. For example Malawi and Ethiopia have what appear to be excessively high student-teacher ratios (65:1 and 59:1). Uganda and Somalia appear to be paying their teachers very poorly in comparison to GNP per capita (0.8 and 1.7). Some countries (e.g. Lesotho, Burundi, Swaziland, Madagascar) may even wish to increase government support of non-teacher salary costs beyond the present 0.1% to 3%. Such increases would have to be balanced against proposed decreases. However even after calculating their effects, there appears to be scope for net savings in unit costs in all countries studied with the exception of Lesotho, Malawi, and Uganda where overall primary level unit costs should most probably be increased.

Trade-offs to Improve Quality

2.32 It may be possible to trade off savings in one area of education for investments in the areas with greater possible returns in terms of student achievement. Research has shown than an appropriate and adequate supply of textbooks improves student achievement and this has a greater effect than lowering student-teacher ratios or raising the percentage of trained teachers. Establishment of school libraries would also be expected to improve achievement at relatively low costs. Therefore, research projects could be undertaken in which savings made in teacher costs through higher student-teacher ratios or lower salaries would be invested in textbooks and libraries, and the results measured to demonstrate under which circumstances there is indeed a net improvement in student achievement.

2.33 Similarly, Ethiopia, Kenya, Malawi, Lesotho, Tanzania, Comoros, Rwanda, and Burundi, among others, use radio programs to upgrade teachers and to improve language teaching. Research has shown that, properly managed, these programs can improve achievement at a reasonable additional cost 5/. Programs initiated in Comoros, Rwanda, and Burundi, with French

5/ See S.P. Heyneman and others, "Textbooks and Achievement: What we Know", World Bank Staff Working Paper No. 298, 1978; Radio for Education and Development, D. Jamison and E. McAnany, Sage Publications, 1978; and Alternative Routes to Formal Education: Distance Teaching for School Equivalence, (ed. H. Perraton), John Hopkins University Press, 1982.

Table 2: POSSIBLE SAVINGS IN PRIMARY EDUCATION UNIT COSTS, EASTERN AFRICA

Countries	Unit Costs (US$)	Savings if Teacher Salaries Reduced to 5 times GNP/Capita		Savings if Gov't Financing of non-Teacher Salary 2/ Items Reduced to 10% of Total Costs		Savings if Student-Teacher Ratio 2/ Increased to 40:1		Total Savings if All Three Measures Applied 1/	
		Amount (US$)	%	Amount (US$)	%	Amount (US$)	%	Amount (US$)	%
Boswana	157	12	8	7	5	31	20	49	31
Burundi	53	21	40	-	-	4	8	24	45
Comoros	47	13	28	*	*	-	-	*	*
Djibouti	278	*	*	17	6	-	-	*	*
Ethiopia	27	13	48	-	5	-	-	13	48 3/
Kenya	53	-	-	2	5	-	-	2	5
Lesotho	36	-	-	-	-	-	-	-	-
Madagascar	*	*	*	-	-	-	-	*	*
Malawi	12.5	-	-	-	-	-	-	-	- 3/
Mauritius	116	-	-	28	24	52	45	69	60
Rwanda	28	-	-	-	-	-	-	-	-
Somalia	27	-	-	8	30	7	26	13	48 3/
Sudan	43	-	-	*	*	*	*	*	*
Swaziland	69	-	-	-	-	10	14	10	14
Tanzania	34	-	-	11	32	-	-	11	32
Uganda	6	-	-	-	-	1	17	1	17 3/
Zaire	*	*	*	*	*	*	*	*	*
Zambia	71	6	8	-	-	-	-	6	8
Zimbabwe	136	10	7	1	1	3	2	15	11
Average								15	23

1/ Total is not equal to sum of the three measures because of interaction of measures when applied simultaneously.
2/ "*" signifies data not available. "-" signifies that country already meets the criterion for this measure.
3/ A portion of these possible savings could be used to lower student-teacher ratios in Malawi and Ethiopia and to increase teachers salaries in Uganda and Somalia.

Source: Annex I, T-4, 5, 6, and 7

Date: October 27, 1983.

27

28

and other international donor assistance, are particularly well run, and have adequate feedback mechanisms. Savings made in teacher costs might be utilized to establish radio programs which, again, could result in net gains in achievement.

Universal Primary Education, Population Growth, and Costs

2.34 All governments in Eastern Africa are committed to achieving universal primary education (UPE) in the shortest possible time. Literacy is considered both a basic right of all people and an esential prerequisite for economic and social development. In 1980 nine countries (Botswana, Comoros, Kenya, Lesotho, Madagascar, Mauritius, Tanzania, Zambia, and Zimbabwe) already enrolled 90% or more of the primary school age population and therefore had essentially reached UPE. Six countries (Malawi, Rwanda, Sudan, Swaziland, Zaire, and Uganda) enrolled 50 to 80% and four countries (Burundi, Djibouti, Ethiopia, and Somalia) enrolled less than 50% of the school age population. The achievement of UPE in the near future by these countries will be very difficult given present financial stringencies. Equally important will be the effect of high rates of population growth, ranging from 2.3% to 4.3% per annum, in every country except Mauritius. These rates of population growth mean, first, that an additional 4-5% per year in real expenditures for primary education are needed merely to retain the present level of school age participation; and secondly that, in a number of countries, increases of 10-20% per annum, a clearly impossible task, woud be needed to meet the goal of UPE twenty years from now.

2.35 All countries in the region could make major savings in primary education expenditures through successful implementation of programs to reduce population growth. Calculations have been made by the World Bank's Population, Health, and Nutrition Department to give a rough idea of the amount of these savings. By and large, after initiating such programs savings would be equivalent to 25% of the primary education budget by the year 2000 and to 65% of the primary education budget in the year 2015. If fertility rates remain as they are at present, then even those countries enrolling over 90% of the school age population today will have difficulty retaining present participation ratios; and the other countries will face an impossible burden of extending education to their population even if all the cost savings measures proposed above are implemented. Table 3 shows the estimated number of school age children by country for the years 2000 and 2015 under various scenarios. Annex I, T-12 and Annex 2 provide detailed projections of primary school costs based on varying population growth assumptions, and, with Table 2 on proposed cost-saving measures, should form a basis for a country by country planning exercise on the financing of primary education.

Costs and Internal Efficiency

2.36 Internal efficiency in education may be defined as the amount of learning achieved during school attendance, compared to the resources provided. Data on learning are very difficult to obtain, and a very poor substitute, the percentage of entering students who complete the course, is often used as a measure of efficiency. A calculation can also be made of the number of school years required to produce one graduate. All the school years spent attending school are summed and the result divided by

Table 3: SCHOOL AGE POPULATION FOR THE YEARS 2000 AND 2015

BASED ON TWO FERTILITY ASSUMPTIONS, EASTERN AFRICA

(School Age Population 000's)

Country	1980	Year 2000			Year 2015		
		No Fertility Decline	Rapid Fertility Decline		No Fertility Decline	Rapid Fertility Decline	
			Amount	% Reduction		Amount	% Reduction
Botswana	175	396	286	28	741	234	68
Burundi	637	1281	932	27	2069	712	66
Comoros	57	113	79	30	198	65	67
Djibouti	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ethiopia	5164	9969	7046	29	17565	5529	69
Kenya	3533	9371	7023	25	19770	6597	67
Lesotho	234	457	314	31	559	287	64
Madagascar	1458	2836	1999	30	5005	1591	68
Malawi	1201	2757	2148	22	5406	1888	65
Mauritius	125	177	132	25	202	141	30
Rwanda	1052	2420	1998	17	4305	2027	53
Somalia	886	1466	1087	26	2399	786	67
Sudan	2930	5606	4239	24	9730	3580	63
Swaziland	118	284	210	26	550	192	65
Tanzania	3567	7201	5444	24	13115	4435	66
Uganda	2553	5306	3926	26	9891	3245	67
Zaire	4788	9450	6517	31	16912	5971	65
Zambia	1095	2271	1744	23	4172	1379	67
Zimbabwe	1369	3521	2828	20	7339	2854	61
Total	30942	63882	47952	25	119927	41513	65

urce: Annex 2 and projections made by the World Bank's Population, Health, and Nutrition Department.

the number of graduates 6/. The result is a rough measure of the difference between actual unit costs per graduate and the theoretical cost per graduate if there were no dropout or repetition. The calculation assumes that all the years spent on a dropout are "lost"; however, some literacy is normally retained after four years of schooling, and the calculation is therefore a very imperfect measure of efficiency.

2.37 Despite these drawbacks, a review of the data can offer guidance on policy options in the region. The countries which require the greatest number of school years to produce one graduate are Ethiopia (17 years), Somalia (17 years), Burundi (16 years), Malawi (16 years), and Madagascar (16 years) (Annex I, T-13); these countries also have the lowest primary school completion rates, ranging from 23% to 35%. The ratio of school years per graduate to the length of the primary school system gives a measure of to what extent actual efficiency diverges from the ideal. In Burundi, Ethiopia, Madagascar, Malawi, Somalia, and Zaire, the cost per graduate is more than twice the theoretical cost if there were no dropouts or repeaters. In other countries, costs range from 1.2 to 1.7 times the theoretical cost.

2.38 Governments can reduce dropout and repetition over the long term through improved primary school quality. In the short term governments can also implement certain policies with relatively minor financial implications which might result in an increase in internal efficiency. For example, in Burundi and Malawi, more than 40% of final year students are repeaters and in Botswana, Comoros, Djibouti, Lesotho, and Madagascar more than 20% are repeaters (Annex I, T-13). Repetition in this year occurs because children sit for the primary school certificate examination as many as four or five times in order to obtain higher scores which would enable them to enter the highly selective secondary school system. Governments

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6/ If data on pass and repetition rates are known, the following equations would give estimates of the number of students who graduate and the number of years to produce one graduate:
p = ratio of students promoted to next grade in following year
r = ratio of students repeating same grade in following year
In a four year primary school system the fraction of initial enrollees who graduate from the system (G) is calculated as follows:

$$G = \frac{P_1\ P2\ P3\ P4}{(1-r_1)\ (1-r2)\ (1-r3)\ (1-r4)}$$

The number of student years (Y) delivered by the system is:

$$Y = \frac{1}{(1-r1)} + \frac{P1}{(1-r1)\ (1-r2)} + \frac{P1\ P2}{(1-r1)\ (1-r2)\ (1-r3)} + \frac{P1\ P2\ P3}{(1-r1)\ (1-r2)\ (1-r3)\ (1-r4)}$$

The number of student years to produce one graduate is therefore $\frac{Y}{G}$.

could therefore consider establishing and enforcing regulations that would limit children sitting for the examination to no more than two times or would require them to attend private rather than public schools. For another example Kenya has initiated a system of providing detailed information to individual schools on examination results and pass rates have been significantly improved; this approach could be duplicated elsewhere and has a low cost. Research has also suggested that additional hours of school attendance or additional homework may be cost-effective ways of increasing achievement.

2.39 Tanzania, Botswana, Sudan, Zambia, and Mauritius have established systems of "automatic promotion" as a means of increasing retention. Experience has shown that this approach is effective only if teachers are prepared to deal with "slow" learners and if remedial classes are available. The unintended results may therefore be a significant lowering of pass rates on the primary school certificate examination. The implications of "automatic promotion" should therefore be carefully scrutinized to ensure that the results are a net improvement in learning.

III. ISSUES IN SECONDARY EDUCATION COSTS

Unit Costs

3.01 Unit costs at the secondary education level average US$430 and vary from US$41 equivalent in Uganda and US$93 in Ethiopia to US$823 in Tanzania, US$806 in Botswana, and US$1075 in Zimbabwe (Annex I, T-4). Unit costs in secondary education average seven times primary education unit costs, with a range of from 2 to 24. In general, the poorer the country, the lower the unit costs at the primary level and the higher the differential between primary and secondary level unit costs. In terms of the ratio of unit costs to GNP per capita, Tanzania's costs are the highest, at 2.94 times GNP per capita, followed by Rwanda (1.73), Burundi (1.52), Zimbabwe (1.24), and Botswana (1.03) (Annex I, T-5). The lowest ratios are those in Mauritius (.19), Uganda (.20), Sudan (.29), and Somalia (.30). In general, as enrollment increases, unit costs go down since boarding is reduced and teacher supply is increased. For instance, Tanzania, Rwanda, and Burundi, all of which have high unit costs, have the lowest secondary enrollment ratios (3 or 4%), while Mauritius, with low unit costs, has the highest enrollment ratio (49%).

3.02 The main elements affecting unit costs are teacher salaries, student-teacher ratios, and non-teacher salary costs (especially boarding costs). Non-teacher salary costs comprise on average 35% of all secondary education costs compared to only 10% in primary education. Each component of unit costs is discussed in detail below.

Secondary School Teachers

3.03 From 1970 to 1978-82, the secondary student-teacher ratio in Eastern Africa increased slightly from 21:1 to 22:1 (Annex I, T-6). Ethiopia has the highest ratio (41:1) followed by Comoros (30:1), Kenya (28:1), and Zaire (27:1). The countries with the lowest student-teacher

ratios are Rwanda (13:1), Sudan (16:1), Burundi (17:1), Botswana (18:1), and Swaziland (18:1). These ratios mask often large variations between lower and upper secondary education in a number of countries. For example the ratios for Comoros are: lower secondary 45:1; upper secondary 11:1; and for Sudan, lower secondary 24:1, upper secondary, 15:1. This variation occurs because some countries have lower secondary schools with a wide base and high enrollments combined with highly selective academic upper secondary schools with numerous subject options (e.g. Comoros, Sudan, Burundi, Kenya, Somalia) while others have more or less unitary secondary school systems (e.g. Malawi, Tanzania, Ethiopia, Mauritius) with high progression rates from lower to upper secondary education.

3.04 In the typical pattern of secondary teacher utilization, students attend classes for 40 periods per week, each of which is 40 minutes in length. On average, teachers teach about 24 periods per week, or the equivalent of 16 hours, and the average student-class size is 35. The result of these practices is about a 21:1 student-teacher ratio. There are policy alternatives which might result in higher student-teacher ratios (Annex I, T-14). Under one alternative, teachers teach an average of 30 rather than 24 periods per week. Under a second alternative the number of class periods per week is reduced to 32, the length of a teaching period is increased to 50 minutes, and teachers teach 24 (50 minute) periods per week. Under a third alternative, the average student class size is increased to 40. Implementing any one of these three alternatives results in increases in the student-teacher ratio from 21:1 to at least 24:1. On this basis increases in student-teacher ratios to 24:1 are feasible in most countries in the region, especially at the lower secondary level where the variety of subjects taught is low. In order to implement such changes, Governments would have to ensure that local headmasters acted in accordance with clearly established guidelines on class size, student contact hours, school size, teacher hiring practices, etc., which would include some combination of the above alternatives.

3.05 The countries with high student-teacher ratios have already introduced combinations of these policies. Ethiopia has established secondary schools with double shifts and long teaching hours; the result is a very high 41:1 student-teacher ratio. The Comoros Islands have a junior secondary system with a student-teacher ratio of 45:1 which is a result of a restricted number of subjects, double shifting, high student class ratios, and high weekly teaching loads. Kenya has relatively high student-teacher ratios because the number of students per class in harambee schools averages about 50 and teacher teach 30 periods per week. Zaire has a large number of students per class and high teaching loads.

3.06 Should savings be made in teacher costs through higher student-teacher ratios, consideration should be given to utilizing a portion of the savings to provide teacher support services, such as laboratory, library, and workshop assistants, duplicating machines, and other simple teaching aids.

3.07 A number of countries have introduced technical and vocational subjects such as home economics, wood work, metal work, and agriculture into the curriculum as a means of "enriching" the curriculum or making it

more "relevant". The class size for these subjects is usually 20 students rather than 40 and also additional specialized staff are required. Overall, a secondary school which devotes a major portion of the curriculum to technical and vocational subjects can expect a significant increase in unit costs because of needs for additional teachers as well as consumable materials and electricity. A study in Tanzania showed that increases in recurrent costs for vocationally oriented schools over academic schools were: for commercially oriented schools, 15%; for technically oriented schools, 36%; and for agriculturally oriented schools, 52%. A study of costs in Swaziland, where about one third of the junior secondary school curriculum is devoted to industrial arts, agriculture, and home economics, gives the following unit cost breakdown:

Table 4: SECONDARY SCHOOL COSTS IN SWAZILAND

Type of School	Unit Capital Costs (1980)	Unit Recurrent Costs (1981)
Traditional Academic School	$1,090	$260
School with "Practical" Subjects	$1,430	$300
% Increase over Academic School	31%	15%

Source: World Bank data

The introduction of these courses should therefore be considered very carefully. If hand tools rather than machine tools are utilized, especially at the lower secondary level, then costs of electricity in particular and of machine maintenance would be reduced, and it may also be possible to increase class size to at least 30, since possible problems of safety would be less serious.

3.08 Savings can also be made in teacher training programs. "Diploma" level programs are designed to train teachers for the junior secondary level, while "degree" programs train teachers for senior level schools. Diploma level programs usually take place in post-secondary but non-university institutions 7/. Annual diploma level teacher training costs in seven countries have been estimated (Annex I, T-15); they range from US$726 equivalent per year in Zambia to US$3,556 per year in Malawi, and the costs per graduate vary from US$1,400 in Zambia to US$7,800 in Zimbabwe and US$10,700 in Malawi. In comparison, degree programs, which take place at the national university in all countries, have yearly costs which range from US$2,550 per year in Swaziland to US$7,700 and US$8,500 in Tanzania and Zimbabwe and costs per graduate which range as high as US$30,000 in Tanzania and Zimbabwe.

7/ In Malawi, diploma level training is carried out at the University.

3.09 Overall the cost per degree graduate is from two to fifteen times the cost per diploma graduate. At the same time, many degree graduates do not enter the teaching profession since they often have the option of working in the civil service or the private sector. Teacher training costs could therefore be lowered through expanding diploma level courses. An alternative is initially to provide only diploma level training, after which teachers would be required to work for at least two years before returning to the higher education system to earn full degrees. Such a program would require good supervision of diploma level teachers.

Teacher Salaries

3.10 On the whole, secondary teacher salaries are from one and a half to nine times higher than salaries paid to primary school teachers (Annex I, T-7). This differential, which is much greater than in developed countries, is in part a carryover from the time when expatriates formed most of the teaching force and is also a result of an overall shortage of secondary school teachers. The highest salaries are in Zimbabwe (US$16,900), Tanzania (US$7,300), and Botswana (US$6,500). The lowest salaries are in Uganda (US$500), Somalia (US$1,100), and Sudan (US$1,200). As a ratio to GNP per capita, the average is 11:1 and the highest salaries are in Tanzania, Ethiopia, Zimbabwe,and Burundi, while the lowest ratios are in Uganda, Sudan, Mauritius,and Somalia. Finally among the ten countries surveyed, Tanzania, Zimbabwe, and Ethiopia have the highest ratios of secondary teachers' salaries to average manufacturing salaries, while Swaziland, Zambia, and Kenya have the lowest ratios (Annex I, T-8).

3.11 Overall Tanzania, Zimbabwe, Ethiopia, and Burundi should consider taking a closer look at teachers salaries to determine whether it is appropriate to keep salary increments below the level of inflation in order to make funds available for expansion of secondary education or for providing other services. On the other hand Uganda, Sudan and Somalia should determine whether low salaries have caused morale problems. These latter countries have very low student-teacher ratios; in conjunction with low salaries they have apparently decreased teachers' responsibilities.

3.12 Somalia, Comoros and Madagascar, among others, require national service from students entering higher education and these students usually teach for one or two years in junior secondary schools. Salary costs of secondary education in these countries would be much higher except for the fact that national service teachers are paid minimal salaries. It is important, however, to give these teachers adequate pedagogical training and to supervise them carefully. Considering the large private benefits of higher education, other governments could consider requiring national service from their higher education students.

3.13 Countries in the region should also consider reviewing their salary scales. Salary scale items of importance include entering salaries, the annual step increases, and salary differentials for headmasters. Typically, these items have not been critically examined in terms of costs or policy objectives. There is usually a large differential between teachers with degree level training and those with less than degree (diploma) level, and expanded production of lower paid "diploma" level teachers would therefore result in significant savings in salaries.

Costs Other than Teacher Salaries

3.14 Costs other than teachers salaries make up about 35% of total governmental secondary school expenditures (Annex I, T-10). These include boarding costs, school operations, school equipment and purchase of textbooks. Botswana, Djibouti, Madagascar, Tanzania, and Uganda spend more than 50% of their secondary education budgets on these items. Burundi, Kenya, Rwanda, Somalia, Zambia, and Zimbabwe spend 20-50% of their budgets on these items. The countries with the lowest non-salary costs are Lesotho (0.1%), Mauritius (11%), Swaziland (11%), and Ethiopia (12%).

3.15 A major element of these costs is boarding costs. Countries with relatively high enrollment ratios and dense population have for the most part eliminated boarding. These include Mauritius, enrolling 49% of the secondary school age population, and Swaziland, enrolling 37% of the school age population, and with an efficient bus system. Lesotho, with a 21% enrollment ratio, has a predominantly non-boarding system, and Ethiopia, with a large number of community schools, also has minimal boarding. These four countries devote less than 12% of their secondary education budgets to non-teacher salary costs. Somalia, Kenya, Zambia, Zimbabwe, Sudan, and Uganda are gradually moving towards day secondary school systems but about one third of enrollment is still in boarding institutions. Burundi, Tanzania, Rwanda, and Malawi enroll more than 75% of their secondary school students in boarding institutions. In these countries enrollment ratios are still very low and travelling distances are often very great. Since the issue is being discussed in a number of countries, it is particularly appropriate to examine the estimated costs and other relative advantages and disadvantages of boarding against non-boarding institutions.

3.16 The cost per student place of constructing, financing, and equipping a school with full boarding and staff housing for one country is estimated as follows:

Table 5: UNIT COSTS OF BOARDING SECONDARY SCHOOL CONSTRUCTION IN MALAWI (1983)

Component	Amount	
	US$	% of Total
Classrooms, administration, and common facilities, including dining hall	2,110	36
Dormitories	1,430	24
Staff housing	1,770	30
Furniture and equipment	570	10
Total	5,880	100

Source: World Bank data

Based on this estimate, a day school could be constructed for at most 75% of the cost of a full boarding school. If staff housing were also excluded, the same number of students could be accommodated for only 45% of the cost for full boarding and staff housing. In addition, the recurrent costs of boarding are estimated to be at least equivalent to the costs of teacher salaries. Thus, without boarding, governments could at least double the number of students covered for the same amount of funds expended for both capital and recurrent costs.

3.17 Over the long term, the switch from a boarding to a day secondary school system is inevitable. However, for countries such as Tanzania, Rwanda, Sudan, Kenya, Burundi, Malawi, and Uganda, systematic planning and experimentation is required to establish a smooth transition. These countries would have to review their policies of assigning the best students to "national" secondary schools. A school mapping exercise would be needed to determine the catchment area and the appropriate size of day secondary schools. Decisions would have to be taken on maximum walking distances, on minimum size of day secondary schools, and on possible streamlining of the curriculum to ensure that teachers would be fully utilized. As a temporary alternative where possible day streams could be added to boarding schools. It has been argued that boarding schools provide a more conducive "atmosphere" for learning and that day school examination results are generally lower than those of boarding schools. However, this may be a result of entrance policies rather than any inherent advantage in boarding and studies on this question should be undertaken. Alternatively decisions could be made to retain boarding but to shift most of these costs to students (see para. 3.23).

3.18 Double shifting is another way to ensure maximum utilization of physical facilities and should be considered in urban areas as well as in densely populated rural areas. Double shifting requires day schools, careful school mapping to ensure adequate catchment areas, and improved school management to ensure programming of teacher and facilities utilization. In some countries teachers have been asked to teach during both shifts. Doubling the teaching load might result in poorer instructional quality and it would be better to increase the load less drastically.

3.19 With the exception of Lesotho, governments in the region also cover much of the operational costs of public secondary schools. However, government support of school operational costs is often inadequate and individual schools usually require fees and/or donations from parents ranging from a few dollars to over US$200 equivalent, for maintenance, equipment, and school construction. In addition in several countries schools which were formerly mission-run are now "quasi-public", and the government covers only a portion of their running costs. In Lesotho most schools are still in this category and the government pays salaries only, with the result that student fees are the highest in the region. In Kenya, the "assisted" harambee schools are in a similar position. School maintenance is important to ensure that physical facilities are adequate. In addition, the proper operation of secondary schools requires science equipment, copy machines, school libraries, and consumables such as chalk, paper, and ink, as well as vehicles in rural areas. It is therefore appropriate for governments to continue to support these items, and to

expand support where possible. Such support should be cost-effective. It might, for example, include science demonstration kits rather than full-scale but costly and under-utilized science laboratories. If public funds are not available then governments should provide guidelines and advice to schools on how to get adequate funds from their students.

3.20 In the case of textbooks, most countries require students to purchase their own textbooks. A few (e.g. Tanzania, Rwanda, Burundi, Comoros, and Ethiopia) provide them free of charge and others (Malawi, Zambia) subsidize the cost. In a period of financial constraints it might be appropriate to reduce or eliminate this support and to ask students to purchase their own textbooks. This would also have the advantage of encouraging better textbook care as well as use of textbooks for future reference outside the school. Over the long-run governments might consider limiting spending on items other than teachers salaries to about 20% of their secondary education budget. This would permit schools to be operated effectively but would also mean major reductions in boarding and other costs.

Cost Recovery

3.21 The issue of cost recovery at the secondary level is different from that at the primary level. In most countries in Eastern Africa there is "excess demand" for a limited number of secondary school places and parents are apparently willing to find the funds necessary for their children to attend secondary schools. Research in several countries has also shown that the "private rate of return" to investment in secondary education is high. Historically church groups were responsible for most secondary schools in English speaking Africa with one or two public institutions run by the colonial authorities. Over time governments have gradually taken responsibility for all or most of the expenses of these institutions. At the same time in a number of countries private institutions account for a large portion of secondary school enrollment and are expanding because of shortages of government funds for public education.

3.22 In Kenya the Ministry of Education now recognizes numerous types of secondary schools. The Government provides "maintained" schools with teachers and makes other payments for operating and capital costs. Among the "maintained" schools are a number of prestigious institutions drawing the best students from the country as a whole. The Government pays 80% of teacher salaries of "assisted" schools. Communities establish harambee schools with completely private or local funding but as the qualifications of teachers rise they apply for classification as "assisted" schools. In addition Kenya has numerous completely private church and commercial (profit-making) secondary schools. In Kenya enrollment and financing of the major types of schools in 1980 were as follows:

Table 6: PUBLIC AND PRIVATE COSTS OF SECONDARY EDUCATION IN KENYA

Type of School	Enrollment		Percentage Financed by	
	Amount	% of Total	Public Sources	Private Sources
Maintained and Assisted	178,000	43	53	43
Assisted Harambee	80,000	20	18	82
Unassisted and Private	152,000	37	0	100
Total	410,000	100	25	75

Source: World Bank data

Despite the very high level of private financing (75% of total costs), enrollment in secondary education is equivalent to 19% of the school age population and output of middle level manpower may have been a significant factor in Kenya's past relatively good economic performance compared to neighboring countries.

3.23 In addition to Kenya data are available for eight countries in Eastern Africa on public and private costs of education. Private costs range from a low of 10% of total costs in Somalia to around 50% in Malawi, Uganda, and Lesotho (Annex I, T-16). The percentage of enrollment in private schools varies from Somalia, Burundi, Comoros, Swaziland, and Zimbabwe, where enrollment in private institutions is negligible, to Tanzania, Kenya, and Madagascar, where private school enrollment is 30% or more of total enrollment (Annex I, T-17). Little work has been done on the income elasticity of demand for secondary education and on the effects of increased fees on attendance by less-privileged socio-economic classes. Many governments and sometimes individual schools have scholarship programs for needy students, but there is little information on this matter.

3.24 Overall, in nearly every country surveyed it is possible to envisage mobilization of additional community, student and parents' financial resources for secondary education. The form such mobilization would take would depend on the particular conditions of each country. In most countries the cost of boarding could be shifted to students; alternatively school boarding could be eliminated and students asked to find their own accommodations. In other cases students could be asked to pay the full cost of textbooks as well as the costs of expendable materials which they will use in the course of their studies. Some rural schools could produce a portion of their food through establishment of school farms. It may also be possible to put aside a portion of all school fees gathered to provide scholarships to needy students.

3.25 It is also appropriate to further encourage private education. In the poorest countries, it may be that the vast majority of parents are unable to afford the costs of private education, and, for the time being, private education may play only a minor part in expansion of the education system. Nonetheless, governments could set up the machinery, including an inspection system to ensure that quality is upheld, to assist in the orderly expansion of private secondary education. At the same time it is important to monitor the effects of expansion of private education on attendance by poorer and rural children, and, if necessary, to establish compensatory public institutions or scholarship schemes in the most deprived areas.

A Cost Reduction Exercise

3.26 As in the case of primary education it is possible to undertake an exercise to give a rough idea of the magnitude of possible unit cost savings which could be made if certain policies are implemented (Table 7). Of course country specific policies depend on country conditions and the proposals made here are designed solely for illustrative purposes.

3.27 A first policy option would be to increase the average student-teacher ratio in secondary education to 24:1. As noted in para. 3.04 this increase would be feasible through the implementation of a combination of policies on teacher contact hours, class size, and curriculum at both junior and senior secondary levels but would also entail control by ministry officials of individual school decisions. Twelve countries (Rwanda, Burundi, Botswana, Swaziland, Tanzania, Lesotho, Malawi, Mauritius, Somalia, Zambia, Uganda, and Zimbabwe) currently have student-teacher ratios which are lower than 24:1 and could make savings of from 4 to 46% in the unit costs of secondary education if they were to increase ratios to this level.

3.28 The second policy option would be to restrict government financing of non-teacher salary items (e.g. boarding, school operation, textbooks) in public schools to no more than 20% of total public secondary school costs. Implementation of this arbitrarily selected figure would mean that governments would cover all the costs of teacher salaries, as well as costs for teaching aids, in-service traning, supervision, and a portion of the costs of school operation and maintenance. Other costs, including especially boarding and textbooks, would be devolved to students, parents, and communities. Based on available data, nine countries (Tanzania, Botswana, Kenya, Uganda, Rwanda, Zambia, Uganda) could make savings of 2 to 44% in expenditures by implementing such a policy. However implementation would obviously take a long time, especially in those countries where boarding is still a very common practice.

3.29 The third policy option would be to restrict teacher salaries to no more than twelve times per capita income. Tanzania, Burundi, Zimbabwe, Ethiopia, and Rwanda would qualify for such a policy and could make savings of 13 to 44% through implementation of this policy option.

3.30 On the basis of the exercise (Table 7), all the countries for which data are available could make savings, and the average would be 38%, compared to an average of 26% in primary education. Tanzania, Rwanda, Botswana, and Burundi could reduce their unit costs by over 50%.

Table 7: POSSIBLE SAVINGS IN SECONDARY EDUCATION UNIT COSTS, EASTERN AFRICA

Countries	Unit Costs (US$)	Savings if Teacher Salaries Reduced to 12 times GNP/Capita		Savings if Gov't Financing of non-Teacher Salary Costs Reduced to 20% of Total Costs		Savings if Student-Teacher Ratio Increased to 24:1		Total Savings if All Three Measures Applied 1/	
		Amount (US$)	%	Amount (US$)	%	Amount (US$)	%	Amount (US$)	%
Botswana	806	-	-	356	44	202	25	468	58
Burundi	350	57	16	76	22	102	29	206	59
Comoros	134	-	-	*	*		-	*	*
Djibouti	288	*	*	*	*	*	*	*	*
Ethiopia	93	41	44	-	-	-	-	42	45 3/
Kenya	201	-	-	82	41	-	-	26	13
Lesotho	234	-	-	-	-	29	12	29	12 3/
Madagascar	*	*	*	*	*	*	*	*	*
Malawi	216	-	-	-	-	27	13	27	13
Mauritius	201	-	-	-	-	25	12	25	12
Rwanda	381	48	13	67	17	175	46	244	64
Somalia	84	-	-	21	25	7	8	26	31 3/
Sudan	104	-	-	*	*	*	*	*	*
Swaziland	271	-	-	-	*	68	25	68	25
Tanzania	823	198	24	365	44	137	17	648	79
Uganda	41	-	-	13	2	2	4	14	35 3/
Zaire	*	*	*	*	*	*	*	*	
Zambia	381	-	-	119	31	32	8	141	37
Zimbabwe	1075	293	27	157	15	45	4	531	49
Average								178	38

1/ Total is not equal to sum of the three measures because of interaction of measures when applied simultaneously.
2/ "*" signifies data not available. "-" signifies that country already meets the criterion for this measure.
3/ A portion of these possible savings might be used to lower student-teacher ratios in Ethiopia, to increase teachers' salaries in Somalia and Uganda, and to increase Government financing of non-teacher salary items in Lesotho.

Source: Annex I, T-4, 5, 6, and 7

Date: October 27, 1983.

3.31 The exercise would not be complete without consideration of policies which might lead to increases in costs. For example, Ethiopia's student-teacher ratio of 41:1 seems very high; Uganda, Sudan, and Somalia appear to have very low teacher salaries which may adversely affect morale; and Lesotho, which finances only teacher salaries, might consider expanding its support of teaching materials and other secondary school costs as a means of promoting higher quality.

Mass Media and Secondary Education

3.32 Experience in several countries has shown that access to secondary education can be expanded at a unit cost which is lower than the costs of traditional secondary schools. The Lesotho Distance Teaching Center (LDTC) provides correspondence courses for secondary school equivalency examinations. Tutorial classes are held from time to time to assist students, and tests are graded at the LDTC headquarters. Pass rates are reported to be higher than in regular schools. The Malawi Correspondence College (MCC), with enrollment which is equal to one third of regular junior secondary enrollment, provides full time classes to students whose grades were not high enough to enter regular secondary schools. Classes are taught by primary school teachers who get additional training from MCC staff. Correspondence material is corrected at MCC headquarters and teaching is supplemented by radio programs. Even though only 20% of MCC students pass the junior secondary examination, compared to 85% in regular schools, the cost per graduate (US$414 equivalent) is lower than that of regular secondary schools (US$568). Institutions like the MCC have the advantages of lower cost as well as offering a second chance to highly motivated students who have not been able to enter the regular system. In order for them to function well, they require a well-managed central staff with an adequate budget for printed materials, a good postal system for distribution of materials, a system for radio utilization, and community organization and interest. Other countries in Eastern Africa could profit from the experience of the LDTC and the MCC and consider establishing or expanding similar programs.

Enrollment Growth and Costs

3.33 The countries with the highest enrollment ratios in secondary education are Mauritius (49%), Swaziland (37%), Lesotho (21%), Comoros (21%), and Botswana (20%) (Annex I, T-1). Mauritius, Swaziland, and Botswana have relatively high per capita incomes and Lesotho, while a very poor country, is part of a larger Southern African labor market; therefore it cannot be said with any certainty that these countries have "overinvested" in secondary education. Only Comoros is a case of high enrollment ratios in a poor country with a restricted labor market but even here there is evidence of emigration of skilled labor and significant worker remittances. It istherefore difficult to determine an "optimum" enrollment ratio in any country. Nonetheless, along with its low per capita income, the region as a whole has the world's lowest secondary enrollment ratios and enrollment ratios of 3% in Burundi and Tanzania and 4% in Malawi and Rwanda are more than likely severe impediments to economic growth. As in the case of primary education, any reduction in population growth will lead to less pressure to expand secondary education with resulting cost savings.

IV. ISSUES IN HIGHER EDUCATION COSTS

Unit Costs

4.01 During the period 1978-82 the unit costs of higher education 8/ in Eastern Africa averaged US$4100 equivalent and ranged from lows of US$895 in Somalia and US$1553 in Ethiopia to US$8661 in Tanzania and US$11081 in Zimbabwe (Annex I, T-18). On average these costs are more than 50 times those of primary education. The unit costs of higher education in Eastern Africa are equivalent to 10.4 times GNP per capita, a figure which is the highest in the world and compares with Asia, 1.2 times per capita income; Latin America, 0.9; and all developed countries 0.5. As a multiple of GNP per capita, the highest costs in Eastern Africa are found in Tanzania (30.9 times GNP per capita), Malawi (15.9), Rwanda (14.0), and Zimbabwe (12.7).

4.02 These figures make it particularly urgent to review costs at this level. Concern with higher education costs led the government of Malawi in 1983 to request assistance from the British Council to review higher education costs and in 1984 the government of Lesotho requested similar assistance from the World Bank. In addition a commission in Kenya has reviewed higher education costs, Unesco recently completed a study of higher education in Ethiopia, USAID has completed sector studies on Somalia and Botswana with chapters on higher education, and World Bank staff have visited and gathered data on Kenya, Tanzania, and Burundi. The following is a summary of the major findings of these reports.

Teaching Costs

4.03 Student-teacher ratios in eleven institutions in Eastern Africa for which data are available averaged 7.4:1, and the only country with a ratio higher than 10:1 was Ethiopia (Annex I, T-19). The lowest ratios were in Tanzania (3.8), Zambia (3.8), and Sudan (5.4). The recommended guidelines for university planning in the United Kingdom are 10:1. The overall US average is 14:1; the French average is 20:1; and averages are also much higher in Asia and Latin America. It appears that, as a matter of national policy, higher education institutions no matter what size have developed the full spectrum of subjects and specializations to the degree level. The result is that class sizes are low. For example in both Burundi and Lesotho, except for law, business studies, and education, the average number of students per course in the fourth and last year of studies is less than 10. Even the larger institutions in Kenya and Sudan have been unable to achieve economies of scale, apparently because of a continued proliferation of courses of study as well as minimum demands on teaching staff.

8/ These data refer to the national university rather than to all post-secondary institutions. They do not include the value of expatriate teachers paid by donor agencies.

4.04 A minimum number of students per course is more than likely necessary for an optimal learning process and overly small enrollments may hinder quality education rather than enhance it. It may also be that production of more than a few graduates in many specializations is not necessary for national development and the small number needed could be produced more expeditiously through overseas scholarships or cooperative programs with other institutions. For example in many countries it might be appropriate to terminate the full degree in physics and to permit only joint majors in physics, chemistry, mathematics and education. Arrangements could be made for the few specially talented students interested in advanced physics to complete their degree training in a neighboring country university or overseas. Similar decisions could be reached in areas such as statistics, philosophy, geography, medicine, engineering, chemistry, etc. In order to increase student-teacher ratios, it would be necessary to carefully review programs, departments, and teaching loads. It would be necessary to determine whether each degree program is essential for national development, whether in the near future enrollments would reach the critical level necessary to sustain quality instruction and in general whether the costs of various programs outweigh the benefits.

4.05 In Eastern Africa full time staff are typically asked to teach no more than eight hours per week. However, most staff engage in a minimum amount of research and have very small classes. It may therefore be possible to increase the number of student contact hours for those staff members with little or no research activities and/or very small classes. In some countries it might also be appropriate to expand specialized post-secondary training institutions in areas such as secondary school teaching, nursing, agricultural extension, accounting, and operational engineering, since these generally have higher student-teacher ratios and lower costs than full-scale national universities. For example Ethiopia has initiated a junior college scheme which may also prove less costly than traditional universities.

4.06 There is little comparative information available on salaries in higher education. Higher education salaries must be competitive with both private sector and civil servant salaries in order to attract the highest quality staff, and therefore any policy on controlling higher education salary increases would have to be based on careful analysis of alternative employment opportunities.

Non-Teaching Costs

4.07 Among countries for which data are available the non-teaching or "overhead" costs of higher education are equivalent to about 60% of total university costs (Annex I, T-20). The smaller institutions of Burundi, Lesotho, and Malawi devote about 70% of their budget to non-teaching costs, while the figure for the larger institutions in Ethiopia and Sudan is closer to 40%. Because of the relatively small size of institutions, the costs of administration are relatively high compared to teaching costs. In addition the institutions provide full or nearly full boarding and staff housing facilities. Finally the costs of equipment and library books are high because in large part these items must be imported.

4.08 It is appropriate to review these costs critically and determine where savings can be made. For example a review of these costs in Lesotho showed that savings equivalent to 16% of the university's budget could be achieved through a combination of eliminating leased housing, privatizing food, maintenance, and car repair services, charging of full costs for the university run primary school, for books and for printing, and closing down two "institutes" which did not appear to be functioning well. A similar review in Malawi recommended savings equivalent to 5.6% of the budget through reduced administrative costs, lower salaries paid to staff while being trained abroad, and control of travel and transport costs. A review in Tanzania showed that administrative staff had grown far more rapidly than number of students and the overall staff-student ratio was approaching 1:1. Other possibilities discussed in these and other countries include: encouraging off-campus living with the effect of reducing recurrent costs of food and housing as well as reducing needs for dormitory construction; asking private firms to take over all food as well as other services traditionally provided by the university at high costs; and gradually withdrawing from the responsibility to provide staff housing (as an interim measure, economic rather than the present nominal rents could be charged to staff using university provided housing and salaries could be temporarily increased to cover the loss of subsidy). When faced with budgetary constraints, some universities (e.g. Kenya, Burundi, Tanzania) have tended to reduce expenditures on library books, equipment and maintenance. Since these elements are essential for good teaching and often require scarce foreign exchange, they should be cut only as a last resort and should be priority items for assistance from bilateral and multilateral agencies.

4.09 Evidence from Lesotho and Tanzania, as well as other countries, is that higher education physical plants are underutilized. Physical and academic planners have not yet become accustomed to using computerized programs for class scheduling. With better scheduling as well as extended teaching hours, it may be possible to expand enrollment without significant investment in new physical facilities. In fact, with better use of existing facilities, encouragement of off-campus living, and increases in staff-student ratios, the marginal cost of increasing higher education enrollment in a number of institutions could be close to zero.

Cost Recovery

4.10 Besides covering the full capital and recurrent costs of higher education institutions, most governments provide stipends to students; these averaged US$766 equivalent per year (Annex I, T-20) in the seven countries for which data are available. This amount is in addition to free tuition and usually only a small portion is returned to the university for room and board costs, with most of the stipend remaining with the student for books and other incidental expenses.

4.11 Free higher education accompanied by student stipends made sense fifteen to twenty years ago, since it was essential to educate, as soon as possible, a core of nationals capable of running the machinery of government, and since the vast majority of higher education students were children of illiterate peasants who could ill-afford the costs of university attendance. The justification for this policy has become

progressively weaker. In the first place, educated nationals are now managing governmental affairs; in fact, in many cases the civil service has expanded excessively, and university graduates are forced more and more to look to the private sector for employment. In the second place, the average socio-economic level of higher education students is more than likely much higher than at independence, since many of them are the children of the political and economic elite already managing the country's affairs.

4.12 Research in several countries in Africa has shown that the "private rate of return" to this level is high and is much higher than the "social rate of return." This suggests both that governments should reduce their subsidies to this level of education and that students will be willing to pay a higher portion of costs. Reducing subsidies to higher education students would provide a greater incentive to them to choose responsibly among alternative education options. They would be more likely to pay attention to "signals" in the labor market and therefore would make better economic choices. In addition since students in higher education institutions tend to come from privileged socio-economic backgrounds and expect to enjoy much higher incomes after they complete their studies, provision of full education to them means that in effect they are subsidized by the needier members of society.

4.13 A reduction in the subsidies provided to higher education cannot be achieved overnight, if only because students constitute a very strong political pressure group. A first step might be to eliminate the "stipends" for incidental expenditures, on the assumption that if students were able to support themselves at secondary schools they should be able to find some way of supporting themselves in higher education. A second step would be to increase charges for food and boarding until the full costs of these services are recovered. Such a policy must be accompanied by a program to assist particularly needy students. Countries could establish a means test for students and then provide scholarships or loans for room, board, and books to those with demonstrated needs. Depending on the country, about one-fourth to one-half of students might qualify for such assistance. In principle loan schemes are more equitable than scholarships and offer the possibility of additional cost recovery. With this in mind Lesotho, Burundi, and Kenya, have initiated loan schemes. However, management and organization problems have been found to be difficult. A loan scheme will work only if an institution such as the income tax division of the treasury, or a bank, has fully accepted loan collection responsibility, and only if penalties on delinquent accounts are made effective. Loan recovery should not be confiscatory, e.g. as a rule of thumb no more than 15% of after tax income of graduates should be collected on an annual basis. Given the difficulties already encountered, countries considering establishing or improving loan schemes should request and receive technical assistance.

A Cost Reduction Exercise

4.14 It is possible to undertake a cost reduction exercise for higher education (see Table 8 on following page). This exercise does not include salaries since data are not readily available on this important cost component. If (a) student-teacher ratios were increased to 12:1 and (b)

the costs of room and boarding were reduced by one half through a combination of improved efficiency and initiation of cost-recovery measures, then countries in the region could reduce their unit costs by an average of 26%. The greatest percentage of savings could be made by Sudan (58%), Tanzania (37%), and Mauritius (32%). On average savings made through increased student-teacher ratios would be 16% compared to 10% savings through reduced room and boarding costs. In some countries it may be appropriate to utilize savings made at this level to strengthen quality and expand coverage at lower education levels, especially when primary enrollment ratios are low. Of course, any policy change would have to be implemented only after careful review of its implications and over a three to five year period. Other cost saving possibilities may be appropriate depending on the country, including especially reductions in other overhead costs such as, in Somalia, publication costs; Malawi, transportation costs; Lesotho, maintenance costs; Tanzania, administration costs.

Higher Education and Development

4.15 Enrollment ratios in Eastern Africa average 1.1% (Annex I, T-1), with the highest ratios in Madagascar (3.1%), and Swaziland (2.5%), and the lowest ratios in Tanzania (0.3%), Malawi (0.4%), Mauritius (0.4% but this does not account for a large number of students attending school in India), and Rwanda (0.4%). Except for Madagascar and Swaziland these ratios are low and will have to be increased to assist in national development. However, such enrollment increases must be based on careful analysis of needs and alternatives, as well as establishment of incentives for students to select higher priority specializations. In addition it is necessary to establish a process to ensure that resources provided to higher education are efficiently and effectively used. One way of strengthening this process would be to set up periodic reviews by outside experts in both the academic and non-academic areas on a three or five year cycle. Such reviews could include information on specific program objectives, structure, staff, students, clientele, placement, and manpower needs, relationships to other programs, students and faculty achievements, and quality compared to other similar institutions. One result of these reviews would undoubtly be an awareness of needs to train students for the private sector, since public sector employment opportunities are already restricted. This would also imply training students in the specific entrepreneurial and creative skills necessary to create industrial enterprises and to generate private sector employment opportunities.

4.16 To strengthen the quality of instruction, higher education institutions should consider establishing programs of cooperation with other institutions for development of programs in high cost areas such as medicine and engineering, as well as for development of centers of excellence in areas such as science, business, public administration, and languages. In the past, these arrangements have often faced serious political and administrative problems. For example the University of Botswana, Lesotho, and Swaziland broke up into its constituent parts because of disputes over management and administration; and after the Faculty of Medicine of the University of Rwanda refused to accept students from Burundi, it was necessary to set up a new Faculty of Medicine in

Table 8: POSSIBLE SAVINGS IN HIGHER EDUCATION

UNIT COSTS, EASTERN AFRICA

Country	Unit Costs (US$)	Savings if Student:Teacher Ratio Increased to 12:1 1/		Savings if Costs of Room and Board Reduced by 50%		Total Savings if Both Measures Applied	
		Amount	%	Amount	%	Amount	%
Botswana	6,572	701	11	657	10	1,358	21
Burundi	2,928	281	10	329	11	610	21
Comoros	*						
Djibouti	*						
Ethiopia	1,553	-	-	155	10	155	10
Kenya	4,149	678	16	271	7	948	23
Lesotho	6,167	472	8	530	9	1,002	16
Madagascar	*						
Malawi	3,172	333	11	151	5	484	15
Mauritius	3,169	697	22	317	10	1,019	32
Rwanda	3,079	*		308	10	308	10
Somalia	895	179	20	89	10	268	30
Sudan	1,533	628	41	263	17	891	58
Swaziland	2,472	190	8	247	10	437	18
Tanzania	8,661	2,356	27	866	10	3,221	37
Uganda	2,313	*		231	10	3,139	10
Zaire	*						
Zambia	3,750	*		375	10	375	10
Zimbabwe	11,081	2,032	18	1,108	10	3,140	28
Average		777 3/	16	393 3/	10	1,084 3/	26

* = Not available
\- = Country meets criterion for this measure.
1/ If data not available, assures teaching costs = 40% of total costs
2/ If data not available, assumes room and board costs = 20% of total costs
3/ Totals are not consistent because of missing data

Source: Annex I, T-18, 19, and 20

Date: July 12, 1984

Burundi. Despite these past setbacks, it is clearly worthwhile in the long run to establish cooperative programs of study which are qualitatively superior and cost effective and can provide manpower essential for national and regional development.

V. MANAGEMENT OF EDUCATION SYSTEMS

5.01 It is necessary to establish a process to successfully identify and implement policies for reducing or controlling educational costs. Governments in Eastern Africa must therefore ensure that appropriate information is gathered and analyzed, that adequate staff are employed and trained, and that policy directives, once established, are enforced.

Information Processing

5.02 Statistical offices in ministries of education in Eastern Africa usually gather standard annual data on enrollment, repetition, teachers, and graduates in the education system, process this information by hand, and publish the results two or three years later in an education statistics yearbook. The presentation of the data follows a standard format developed a decade ago. These offices usually gather little or no financial data. With the advent of relatively inexpensive computers, it is possible for statistical offices to provide additional relevant information with minimum increase in costs. Calculations can be made nationwide, as well as by region, of student flows, unit costs, costs per graduate, student-teacher ratios, and teacher qualifications. Computer programs are now available to project enrollments, graduates, teacher requirements, and financial implications of enrollment expansion according to various scenarios. The ease of the computations permit annual reviews of progress toward meeting national policies and goals.

5.03 An education financing simulation model for use with micro-computers has been developed by the World Bank. This model differs from hitherto available models by making enrollment projections dependent on decisions on: (a) the amount of funds which will be available to the education system over a period of time, and (b) the unit costs of education levels, which are in turn based on student-teacher ratios, teacher salaries, and administrative and materials costs. The model therefore permits projections to be made within agreed upon budgetary constraints. Hitherto, enrollment and teacher projections models were designed and these would either stand as agreed upon objectives without adequate reviews of budgetary constraints or had to be adjusted in an ad hoc manner to fit within these constraints. In contrast this model allows simulation of effects due to changes in the available funds to education sub-sectors, as well as to combinations of changes in the budget and the operations of the education system. One of the innovations of the model is a detailed projection of teacher salary costs, including decisions on number of teacher steps and salary increments between steps. The model showed that in Burkina Faso a series of seemingly minor adjustments in teacher salary increments and student-teacher ratios could release significant amounts of funds to permit enrollment expansion.

5.04 The presentation of education budgets can also be improved to provide better opportunities for analysis. Most budget documents in Eastern Africa have highly aggregated categories such as "transfers" and "grants in aid". Budget documents should show the main categories of expenditures for each level of education --primary, secondary, technical, higher, teacher training, and adult education--as well as for general administration, and for each autonomous agency or institution. For each level, budget documents should provide line item estimates for expenditures on: (a) personal emoluments (e.g. teachers and others); (b) material and equipment (e.g. school equipment, office equipment, textbooks, and teaching materials); (c) running expenses (e.g. transport, electricity and water, office expenses, maintenance expenses, and student welfare expenses); (d) boarding expenses; and (e) grants and scholarships to students. This level of detail would provide the raw data needed for the analysis and projections discussed above.

5.05 Efforts to provide additional financial information for policy analysis have begun in only a few countries (e.g. Lesotho, Swaziland, Malawi), but there is an urgent need to initiate efforts elsewhere. As a first step micro-computers should be purchased and computer personnel hired and trained. In addition, three countries --Sudan, Madagascar, and Zaire --are not processing even the data of the type traditionally gathered and require urgent efforts to strengthen their basic statistical services.

Staffing and Training

5.06 Planning offices in ministries of education in Eastern Africa are usually overwhelmed with day-to-day problems with little time for policy analysis, and most of their efforts are spent preparing the capital budget and dealing with donor agencies. These offices often suffer from high staff turnover because of low pay and more attractive offers elsewhere, especially for economists and statisticians. There is a need to establish a more permanent and well paid staff including competent and motivated education planners, economists, statisticians and computer personnel. Training available at the International Institute for Education Planning (IIEP), in World Bank sponsored EDI courses, as well as in masters degree programsin the UK, USA, and France, should be effectively utilized.

5.07 Administration, personnel, and accounting offices of the ministries of education are also usually overwhelmed with day-to-day problems. Routine decisions such as hiring of individual teachers need to be taken to a lower level in the chain of command, to ensure that departmental chiefs can become responsible for developing and enforcing policy guidelines. Middle level assistants and supervisors need basic training to carry out their responsibilities. Departmental chiefs need to be introduced to the necessity for policy making and implementation as well as to needs for better personnel management.

5.08 Headmasters of primary and secondary schools often handle large amounts of money collected from fees but have little or no training in financial management, and cases of mismanagement or private use of funds are often reported. Headmasters also are weak in areas such as timetabling, rotating use of school facilities, and personnel management in

general. In recognition of these needs, Kenya recently initiated a program of headmaster training. Lesotho, Malawi, and Zaire are initiating similar programs; there is a need for other Eastern Africa countries to seriously consider such programs.

5.09 Overall, there is also a need for a committment to a new kind of technical assistance provided through the Ministry of Education. The purpose of this assistance would be to help communities and schools to improve local financial management. A "technical assistance" unit could establish guidelines for local school construction, assist in bulk procurement of textbooks, furniture, and equipment, provide feedback on examination results, and provide overall guidelines and advice for school management.

The Decision-Making Process

5.10 Often one or two high level officials in the ministry of education make budgetary decisions on an ad-hoc basis, and there is little time or capacity to analyze departmental budgets or to undertake dialogue with department heads. A more systematic framework is therefore required for the review of education budgets. Decisions need to be made on which sub-sectors of the education system are of the highest priority and on whether costs of various sub-sectors are appropriate to national policy objectives. Because of the nature of education systems, policies cannot be put into effect immediately. It is therefore important to have rolling three to five year plans, and to review progress towards stated goals annually. There is a need to establish a permanent budget review staff inside the ministry of education, possibly through expansion of the planning office, which would be charged with coordinating the capital and recurrent budgets. Ministries of finance also need to improve the quality and extent of their review of education budgets.

5.11 There is also a need to establish and then to follow-up on policy decisions relative to costs. For example, formulas for determining whether new staff are required in secondary schools can be established, based on student-teacher ratios and staff contact hours. These formulas are often stated in official regulations but they are not enforced. School headmasters should adhere to these formulas and release teachers in order to be within established norms. A system of rules and regulations for school collection and utilization of fees should also be established to ensure that fees are utilized in accordance with agreed upon national policies.

5.12 There are special problems with regard to autonomous education agencies such as universities, institutes of education, and testing agencies. Ministries of education and finance often do not have the time or capacity to subject these agencies to scrutinity of their budget requests. In most cases, these ministries are represented on the governing boards of these institutions and may be in a conflict of interest when they initiate their own review after the boards have taken decisions or made proposals. There is a need to put pressure on these institutions, i.e. to require them to formally defend and justify their expenditures to a much greater extent than has previously been done.

ENROLLMENT RATIOS, EASTERN AFRICA,
1970-1982 1/

	1970			1977-1982				Number of Years in Cycle	
	Primary	Secondary	Higher	Primary	Secondary	Higher	Year of Data	Primary	Secondary
Botswana	66	7	-	94	20	1.5	80	7	5
Burundi	27	2	0.2	29	3	1.0	81	6	7
Comoros	33	3	-	99	21	1.4	80	6	7
Djibouti	-	-	-	32	8	0.5	81	6	7
Ethiopia	16	4	0.2	38	9	0.5	80	6	6
Kenya	60	8	0.9	92	19	1.0	79	7	6
Lesotho	89	7	0.5	116	21	1.3	82	7	5
Madagascar	88	11	1.0	94	14	3.1	77	6	7
Malawi	35	2	0.3	62	4	0.4	81	8	4
Mauritius	106	31	2.6	99	49	0.4	79	6	7
Rwanda	73	2	0.2	70	4	0.4	80	8	6
Somalia	9	4	0.4	22	12	1.0	80	8	4
Sudan	38	7	1.2	51	13	-	80	6	6
Swaziland	86	15	0.6	79	37	2.5	80	7	5
Tanzania	39	3	0.2	98	3	0.3	81	7	6
Uganda	39	4	0.5	54	5	0.6	80	7	6
Zaire	88	9	0.7	84	13	1.1	78	6	6
Zambia	91	13	0.4	95	16	1.5	80	7	5
Zimbabwe	74	7	-	90	15	0.5	81	7	6
Average	55	8	0.7	74	15	1.1			

1/ Primary and secondary level ratios are calculated by dividing enrollment in the particular level by the estimated number of children in the officially designated appropriate age group. For higher education, the age group is arbitrarily estimated at 20-24. Primary education figures may be greater than 100% when overaged children and repeaters attend school. The length of primary schooling varies from six to eight years and the length of secondary education varies from four to seven years; this makes direct comparisons between countries difficult.

Sources: 1970 - Unesco Statistical Yearbook.
1977-82 - World Bank Comparative Education Indicators, except Mauritius, primary and secondary, and Rwanda, primary, for which the source is Unesco.

Date: October 1, 1983

ANNEX I
Table 2

RECURRENT EDUCATION EXPENDITURES AS A PERCENTAGE OF TOTAL EDUCATION EXPENDITURES AND OF GNP
EAST AFRICA 1970-82

	1970		1978-82		
	% of Recurrent Gov't Budget	% of GNP	% of Recurrent Gov't Budget	% of GNP	Year of Data
Botswana	15.9	4.4	20.0	5.1	80
Burundi	25.8	2.3	18.7	2.4	81
Comoros	-	-	29.1	5.4	80
Djibouti	-	4.7	10.9	7.7	81
Ethiopia	14.2	1.5	11.2	2.4	82
Kenya	23.3	4.7	23.4	5.2	80
Lesotho	-	-	18.5	2.7	79
Madagascar	18.9	3.6	23.8	4.2	79
Malawi	16.4	3.0	11.3	2.2	81
Mauritius	14.0	3.4	17.7	4.0	78
Rwanda	28.3	2.2	21.3	2.8	80
Somalia	7.6	1.0	11.2	1.4	80
Sudan	14.2	3.6	14.3	3.0	78
Swaziland	20.1	4.5	22.0	4.1	82
Tanzania	19.7	3.7	18.0	4.4	81
Uganda	22.3	3.2	16.7	1.2	80
Zaire	20.4	6.1	-	-	-
Zambia	16.1	3.7	12.1	4.5	80
Zimbabwe	16.1	3.3	19.5	5.1	80
Average	18.3	3.5	17.8	3.8	-

Sources: 1970 - Unesco Statistical Yearbook
1978-1982 - World Bank Appraisal Reports and Sector Studies.

Date: September 30, 1983

PERCENTAGE OF TOTAL GOVERNMENT EXPENDITURES AND OF GNP DEVOTED TO EDUCATION EASTERN AFRICA, 1970-1982

Country	1970 Education Expenditure as 1/ % of Total Gov't Expenditure	1970 Education Expenditure as 1/ % of GNP	1978-82 Education Expenditure as 1/ % of Total Gov't Expenditure	1978-82 Education Expenditure as 1/ % of GNP	Year of Data
Botswana	12.3	5.2	19.3	6.3	79
Burundi	-	-	19.0	2.8	81
Comoros	-	-	25.4	6.5	80
Djibouti	-	6.0	10.8	5.4	81
Ethiopia	12.9	1.8	11.1	2.2	80
Kenya	17.6	5.0	18.0	5.9	79
Lesotho	22.0	4.7	17.9	6.5	82
Madagascar	18.5	3.2	-	3.7	80
Malawi	13.2	4.1	11.4	3.5	81
Mauritius	11.5	3.7	11.5	6.0	80
Rwanda	26.6	2.3	21.3	3.2	80
Somalia	7.0	-	10.5	1.5	81
Sudan	12.6	3.9	-	3.0	80
Swaziland	17.3	5.2	18.8	7.9	80
Tanzania	16.0	4.5	17.7	5.9	80
Uganda	17.8	3.9	16.1	1.2	80
Zaire	17.6	5.7	22.0	6.0	78
Zambia	10.9	4.7	11.1	4.5	80
Zimbabwe	-	3.4	19.5	5.1	81
Average	15.5	4.2	15.6	4.6	

1/ Includes both capital and recurrent expenditures.

Sources: 1970: Unesco Statistical Yearbook, except Zaire (World Bank) and Somalia (World Bank 1973). Data on Madagascar are for 1975.
1978-82: World Bank Comparative Education Indicators, except Madagascar (Unesco).

Date: October 1, 1983

ESTIMATED UNIT COSTS TO GOVERNMENTS OF PUBLIC EDUCATION

EASTERN AFRICA

	Level of Education: Primary		Level of Education: Secondary				
	National Currency	US$	National Currency	US$	Year of Data	Exchange Rate	Source
Botswana	P 123	157	P 630	806	1979	P 1 = US$ 1.28	WB Appraisal Report
Burundi	FB 4775	53	FB 31531	350	1981	FB 100 = US$ 1.11	WB Appraisal Report
Comoros	FC 1081	47	FC 3082	134	1979	F CFA 100 = US$ 4.347	WB Appraisal Report
Djibouti	FD 53312	300	FD 68057 1/	383	1982	FD 100 = US$ 0.56	WB Sector Memorandum
Ethiopia	B 56	27	B 192	93	1981	B 1 = US$ 0.483	Gov't of Ethiopia and Unesco Sector Studies
Kenya	S 400	53	S 1520	201	1980	KS 1 = US$ 0.132	WB Financial Study
Lesotho	M 39.4	36	M 254.1	234	1982	M 1 = US$ 0.92	WB Appraisal Report
Madagascar	-	-	-	-	-	-	
Malawi	K 13.6	12.5	K 235	216	1981	K 1 = US$ 0.92	WB Appraisal Report
Mauritius	R 896	116	R 1543	201	1979	R 1 = US$ 0.13	WB Sector Memorandum
Rwanda	FR 2570	28	FR 35272	381	1980	FR 100 = US$ 1.08	WB Appraisal Report
Somalia	S 416	27	S 1268	84	1982	S 1 = US$ .066	USAID Sector Report
Sudan	LS 55.7	43	LS 135.4	104	1980	LS 1 = US$ 0.77	WB Appraisal Report
Swaziland	E 60	69	E 236	271	1981	E 1 = US$ 1.15	Gov't of Swaziland Sector Study
Tanzania	S 284.9	34	S 6860	823	1981	S 1 = US$ 0.12	WB Appraisal Report
Uganda	S 569	6	S 4095	41	1981	S 1 = US$ .01	Unesco Sector Report
Zaire	-	-	-	-	-	-	
Zambia	K 62	71	K 331	381	1980	K 1 = US$ 1.15	WB Appraisal Report
Zimbabwe	Z$ 98.8	136	Z$ 779	1075	1981	Z$ = US$ 1.38	WB Sector Memorandum
Average		71.5		340			

1/ Not including foreign teacher salaries

Date: September 29, 1983

ANNEX I
Table 5

UNIT COSTS AS A MULTIPLE OF

GNP PER CAPITA, EASTERN AFRICA

	Level of Education		GNP per Capita (US$)	Year of Data
	Primary	Secondary		
Botswana	.20	1.03	780	79
Burundi	.23	1.52	230	81
Comoros	.18	.52	260	79
Djibouti	.63	.80	480	82
Ethiopia	.19	.66	140	81
Kenya	.14	.52	390	80
Lesotho	.07	.43	540	82
Madagascar	-	-	-	-
Malawi	.06	1.08	200	81
Mauritius	.11	.19	1080	79
Rwanda	.13	1.73	220	80
Somalia	.10	.30	280	82
Sudan	.12	.29	360	80
Swaziland	.09	.36	760	81
Tanzania	.12	2.94	280	81
Uganda	.03	.20	210	81
Zaire	-	-	-	-
Zambia	.12	.66	580	80
Zimbabwe	.16	1.24	870	81
Average	.16	.85		

Source: Table 4

Date: October 4, 1983

PRIMARY AND SECONDARY STUDENT - TEACHER RATIOS

EASTERN AFRICA, 1970-1982

Country	Ratios, 1970		Ratios, 1978-82		Year of Data
	Primary	Secondary	Primary	Secondary	
Botswana	36	22	32	18	80
Burundi	37	12	37	17	81
Comoros	42	20	45	30	80
Djibouti	36	12	41	19	81
Ethiopia	48	31	59	41	80
Kenya	34	22	40	28	79
Lesotho	46	24	48	21	82
Madagascar	65	21	47	23	78
Malawi	43	18	65	21	81
Mauritius	32	25	22	21	80
Rwanda	60	--	40	13 1/	80
Somalia	23	25	29	22	80
Sudan	47	17	34	16	80
Swaziland	40	19	34	18	80
Tanzania	46	19	43	20	80
Uganda	34	22	34	23	80
Zaire	43	--	42	27	78
Zambia	47	21	48	22	80
Zimbabwe	--	32	39	23	81
Average	43	21	41	22	--

1/ Figures for Rwanda do not include post-primary vocational training, where the student-teacher ratio is 21:1.

Sources: 1970 - Unesco Statistical Yearbook

1978-82 - World Bank Comparative Education Indicators.

ESTIMATED AVERAGE TEACHER SALARIES AND AS A MULTIPLE OF

GNP PER CAPITA, PRIMARY AND SECONDARY EDUCATION, EASTERN AFRICA

	Primary Education Average Teacher Salary			Secondary Education Average Teacher Salary			GNP per Capita in US$	Exchange Rate	Year of Data
	In Local Currency	In US$	As a Multiple of GNP per Capita	In Local Currency	In US$	As a Multiple of GNP per Capita			
Botswana	3,361	4,291	5.5	5,069	6,485	8.3	780	P1 = US$ 1.28	79
Burundi	175,438	1,947	8.5	335,553	3,725	16.2	230	FB100 = US$ 1.11	80
Comoros	43,781	1,904	7.3	64,722	2,814	10.8	260	FCFCA100 = US$ 4.347	79
Djibouti	-	-	-	-	-	-	480	FD100 = US$ 0.56	82
Ethiopia	3,043	1,467	10.5	6,919	3,352	23.9	140	B1 = US$ 0.483	81
Kenya	13,648	1,808	4.6	29,579	3,911	10.0	390	KS1 = US$ 0.132	80
Lesotho	1,889	1,726	3.2	5,283	4,865	9.0	540	M1 = US$ 0.92	82
Madagascar	-	-	-	-	-	-	-	FMG100 =US$ 0.47	79
Malawi	867	797	4.0	2,570	2,364	11.8	200	K1 = US$ 0.92	81
Mauritius	12,951	1,677	1.6	28,903	3,765	3.5	1,080	R1 = US$ 0.013	79
Rwanda	98,688	1,065	4.8	302,634	3,268	14.9	220	FR100 = US$ 1.08	80
Somalia	7,190	466	1.7	16,682	1,105	3.9	280	S1 = US$ .066	82
Sudan	1,704	1,316	3.7	1,517	1,165	3.2	360	LS1 = US$ 0.77	80
Swaziland	2,028	2,332	3.1	3,785	4,346	5.7	760	E1 = US$ 1.15	81
Tanzania	7,130	851	3.0	61,054	7,325	26.2	280	S1 = US$ 0.12	81
Uganda	18,495	185	0.8	50,850	509	2.3	220	S1 = US$ 0.01	81
Zaire	-	-	-	-	-	-	-	- -	-
Zambia	2,768	3,183	5.5	4,005	4,606	7.9	580	K1 = US$ 1.15	80
Zimbabwe	3,433	4,725	5.4	12,237	16,887	19.4	870	Z$1 = US$ 1.38	81
Average	-	1,859	4.6	-	4,406	11.0			

Sources: For Malawi, Rwanda, Uganda, and Zambia, data were provided by Government. For other countries, figures are estimated by multiplying unit costs per student (Table 4) times student-teacher ratio (Table 6). This figure is then multiplied by the percentage of costs covered by salaries (Table 8). Where data are missing (Comoros, Sudan, Zaire), it is assumed that teachers salaries make up 90% of the costs to the government of primary education. For secondary education, the figure is multiplied by the estimated percentage of salary costs to the government, from Table 8. Where data are missing, the figure is multiplied by 70%.

Date: October 1, 1983

TEACHERS' SALARIES AS A RATIO OF MANUFACTURING SALARIES, EASTERN AFRICA

Country	Average Salary, Manufacturing Sector (1)	Average Primary School, Teachers' Salary (2)	Ratio of (2) to (1) (3)	Average Secondary School, Teachers' Salary (4)	Ratio of (4) to (1) (5)	Year of Data	Source of Manufacturing Data
Botswana	P1664	P3361	2.02	P5069	3.05	1979	World Bank Economic Report
Burundi	FB110616	FB175438	1.59	FB335553	3.03	1980	ILO Yearbook, Table 17
Comoros	n.a.						
Djibouti	n.a.						
Ethiopia	B2031	B3043	1.50	B6919	3.41	1979-81 1/	World Bank Economic Report
Kenya	S14830	S13648	.92	S29579	1.99	1980	World Bank IDF Estimates
Lesotho	n.a.						
Madagascar	n.a.						
Malawi	K828	K867	1.05	K2570	3.10	1981	ILO Yearbook, Table 17
Mauritius	R11232	R12951	1.15	R28903	2.57	1979	World Bank Economic Report, 1982
Rwanda	n.a.						
Somalia	n.a.						
Sudan	n.a.						
Swaziland							
Skilled Workers	E7284	E2028	.28	E3785	.52	1981	ILO Yearbook, Table 17
Unskilled Workers	E1524		1.33		2.48		
Estimated Average 2/	E2676		.76		1.42		
Tanzania	S10596	S7130	.67	S61054	5.76	1981	World Bank IDF Estimates
Uganda	n.a.						
Zambia	K2160	K2768	1.28	S4005	1.85	1980	ILO Yearbook, Table 17
Zimbabwe	Z$3117	Z$3433	1.10	Z$12237	3.93	1981	World Bank IDF Estimates
Average			1.20		3.01		

1/ Ethiopia: 1979 for manufacturing - 1981 for teachers' salaries.
2/ Assumes 80% unskilled workers

Source: As above and Table 7

Date: June 15, 1984

ANNEX I

Table 9

RANK ORDER OF RATIOS OF TEACHER SALARIES TO AVERAGE MANUFACTURING SALARIES, AND GNP PER CAPITA, FOR TEN COUNTRIES IN EASTERN AFRICA

Country	Primary Education		Secondary Education	
	Teacher Salaries/ Manufac-turing Salaries	Teacher Salaries/ GNP per Capita	Teacher Salaries/ Manufac-turing Salaries	Teacher Salaries/ GNP per Capita
Botswana	1	3	5	7
Burundi	2	2	6	4
Ethiopia	3	1	3	2
Kenya	8	6	8	6
Malawi	7	7	4	5
Mauritius	5	10	7	10
Swaziland	9	8	10	9
Tanzania	10	9	1	1
Zambia	4	3	9	8
Zimbabwe	6	5	2	3

Source: Tables 7 and 8

Date: June 8, 1984

ANNEX I
Table 10

PERCENTAGE OF GOVERNMENT EXPENDITURE BY PURPOSE FOR PRIMARY AND SECONDARY EDUCATION, EAST AFRICA

		Administrative	Teachers Emoluments	Teaching Materials	Scholarships	Welfare Services	School Operation and Other	Year of Data	Source
Botswana	Primary	-	85.4	-	-	5.2	9.4	79	UN
	Secondary	-	44.7	-	3.5	2.7	49.1	-	-
Burundi	Primary	-	99.3	0.5	-	-	0.2	79	UN
	Secondary	-	62.6	0.7	-	34.6	2.1	-	-
Comoros	Primary	-	-	-	-	-	-	-	
	Secondary	-	-	-	-	-	-	-	-
Djibouti	Primary	-	84.0	5.7	-	8.0	2.3	79	UN
	Secondary	-	49.0	13.1	31.6	0.6	5.7	-	-
Ethiopia	Primary	-	92.1	5.0	-	-	2.9	78	UN
	Secondary	-	87.9	5.8	-	-	6.3	-	UN
Kenya	Primary	2.1	85.3	2.6	-	10.0	-	83	National Budget
	Secondary	-	69.5	-	-	-	30.5	-	-
Lesotho	Primary	-	99.9	-	-	-	0.1	82	Education
	Secondary	-	99.9	-	-	-	0.1	-	Survey
Madagascar	Primary	2.4	97.4	0.2	-	-	-	79	UN
	Secondary	13.3	48.3	5.1	32.6	0.7	-	-	-
Malawi	Primary	-	98.1	-	-	-	1.9	82	UN
	Secondary	-	85.7	-	-	-	14.3	-	-
Mauritius	Primary	28.3	65.7	0.1	-	3.9	2.0	79	UN
	Secondary	8.6	89.2	0.2	-	1.0	1.0	-	-
Rwanda	Primary	-	96.0	4.0				83	National Budget
	Secondary	-	66.0	5.0	-	18.0	-	-	-
Somalia	Primary	17.1	59.6	-	-	22.6	0.7	82	National Budget
	Secondary	10.7	59.8	12.1	-	17.3	0.1	-	-
Sudan	Primary	-	-	-	-	-	-	-	-
	Secondary	-	-	-	-	-	-	-	-
Swaziland	Primary	-	99.4	-	-	0.2	0.4	82	National Budget
	Secondary	-	89.1	-	-	7.5	3.4	-	-
Tanzania	Primary	2.6	58.2	28.9	6.5	1.3	2.5	79	UN
	Secondary	2.2	44.5	3.6	5.5	27.3	16.9	-	
Uganda	Primary	0.8	95.6	-	-	-	3.6	83	National Budget
	Secondary	-	54.0	-	-	-	46.0	-	
Zaire	Primary	-	-	-	-	-	-	-	-
	Secondary	-	-	-	-	-	-	-	-
Zambia	Primary	-	93.0	6.0	-	1.0	1.0	83	National Budget
	Secondary	-	55.0	4.9	-	27.0	13.1	-	-
Zimbabwe	Primary	-	89.1	4.5	-	-	6.4	83	National Budget
	Secondary	-	68.3	15.8	-	15.7	0.2	-	-
Average	Primary	3.2	87.3	3.5	0.4	3.6	2.0		
	Secondary	2.3	64.4	4.2	4.6	8.6	11.9		

Sources: UN - Unesco Statistical Yearbook
Budget - Government Budget Documents

Date: September 30, 1983

UNIT COST FOR STUDENTS AND FOR GOVERNMENTS IN PRIMARY EDUCATION,

EASTERN AFRICA

	Unit Cost to Gov't	Student Fees		Other Student Costs					Year of Data	Source
		Amount	as % of Total Cost	Books and Materials	Uniforms and Shoes	Transport	Incidentals	Construction		
Botswana	P174	0	0	-	P15	-	-	-	82	USAID Sector Survey
Burundi	FB4775	0	0	90	n.a.	n.a.	n.a.	n.a	81	WB Appraisal Report
Kenya	S400	17	4	n.a.	3	n.a.	n.a.	n.a.	80	WB Study of Education Financing
Lesotho	M39.50	3.50	8	n.a.	n.a.	n.a.	n.a.	n.a.	82	MOE Sector Survey
Malawi	K13.50	5	27	4	9	5	18	-	82	WB Study on Financing of Education
Somalia	S379	0	0	64	200-250	-	-	-	82	USAID Sector Survey
Swaziland										
Lower Primary	E64	4.65	7	5.90	n.a.	n.a.	-	3.83	80	MOE Study on Financing of Education
Upper Primary	E81	5.78	7	12.24	n.a.	n.a.	-	2.65	80	MOE Study on Financing of Education
Tanzania	S285	0	0	0	n.a.	n.a.	-	-	80	Unesco Sector Survey
Uganda	S569	153	21	n.a.	n.a.	n.a.	-	n.a.	80	Unesco Sector Survey
Zambia	ZK262	8	3	27.50	40	-	-	-	81	MOE Data
Zimbabwe	Z$99	0	0	n.a.	n.a.	n.a.	n.a.	n.a.	81	WB Sector Report

Date: May 15, 1984

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ANNEX I
Table 12

POSSIBLE SAVINGS IN PRIMARY EDUCATION COSTS WITH DECREASED FERTILITY RATES, FOR THE YEAR 2000 AND 2015

Country	Year	Costs if Fertility Remains Constant (1980 costs = 100)		Costs if Fertility Declines Rapidly (1980 costs = 100)		% Cost Savings with Rapid Fertility Decline
		No Change in Enrollment Ratio	UPE by the year 2000	No Change In Enrollment Ratio	UPE by the Year 2000	
Botswana	2000	226	235	163	170	28
	2015	423	441	133	139	68
Burundi	2000	201	679	146	494	27
	2015	324	1097	111	377	66
Comoros	2000	198	196	138	137	30
	2015	347	343	114	112	67
Djibouti	2000	-	-	-	-	-
	2015	-	-	-	-	-
Ethiopia	2000	193	497	136	351	29
	2015	340	877	107	276	69
Kenya	2000	265	282	198	211	25
	2015	559	596	186	198	67
Lesotho	2000	195	164	134	113	31
	2015	337	285	122	103	64
Madagascar	2000	-	-	-	-	-
	2015	-	-	-	-	-
Malawi	2000	229	362	178	282	22
	2015	450	711	157	248	65
Mauritius	2000	141	140	105	112	20
	2015	161	159	104	111	30
Rwanda	2000	230	322	189	265	18
	2015	409	572	192	269	53
Somalia	2000	165	737	122	546	26
	2015	270	1206	88	395	67
Sudan	2000	191	367	144	278	24
	2015	332	638	122	234	63
Swaziland	2000	240	298	177	220	26
	2015	466	578	162	201	65
Tanzania	2000	201	201	152	152	24
	2015	367	367	124	124	66
Uganda	2000	207	377	153	279	26
	2015	387	703	127	230	67
Zaire	2000	-	-	-	-	-
	2015	-	-	-	-	-
Zambia	2000	207	213	159	164	23
	2015	381	393	125	129	67
Zimbabwe	2000	258	281	207	226	20
	2015	538	586	209	228	61
Average	2000	209	334	156	250	25
	2015	381	597	136	211	63

FLOW RATES, EFFICIENCY, REPETITION AND COST PER GRADUATE

PRIMARY EDUCATION, EASTERN AFRICA

	% of Enrollees Who Graduate	Number of Years to Produce 1 Graduate (est.)	Number of Years of Primary Education	Efficiency Index Ratio of (2) to (3)	Percentage of Repeaters		Cost per Graduate		Year of Data
					Overall	In Last Year of Schooling	Present Cost (US$)	Cost if no Dropout or Repetition (US$)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Botswana	74	8.6	7	1.2	2.9	20	1350	1099	80
Burundi	35	16.2		2.7	28.7	47	859	318	79
Comoros	65	9.3	6	1.6	24.6	28	437	282	80
Djibouti	n.a.	-	6	-	18.9	32	-	-	75
Ethiopia	25	17.4	6	2.9	13.6	10	470	162	81
Kenya	74	8.9	7	1.3	5.9	10	472	371	77
Lesotho	61	11.2	7	1.6	16.4	22	403	252	79
Madagascar	33	15.9	6	2.7	24.4	26	-	-	75
Malawi	23	16.2	8	2.0	17.4	43	203	100	80
Mauritius	78	-	6	-	n.a.	n.a.	-	-	-
Rwanda	62	11.2	8	1.4	5.7	0	314	224	80
Somalia	26	17.1	8	2.1	n.a.	n.a.	462	216	81
Sudan	68	7.7	6	1.3	2.4	9	331	258	70
Swaziland	50	11.9	7	1.7	10.9	16	821	483	79
Tanzania	87	7.6	7	1.1	0.4	2	258	238	75
Uganda	61	10.4	7	1.5	9.6	2	62	42	79
Zaire	44	12.5	6	2.1	20.3	14	-	-	77
Zambia	80	8.1	7	1.2	1.1	4	575	497	78
Zimbabwe	55	-	7	-	n.a	n.a.	-	-	-
Average	56	11.9	6.7	1.8	12.7	18	501	324	

Sources: (1) World Bank Comparative Education Indicators
(2 For most countries, calculated on the assumption that pass rate and repeater rate remain constant. For Comoros, Malawi, and Ethiopia calculated using actual yearly repeater and dropout rate derived from available statistics. For Somalia, provided in USAID Sector Survey.
(3), (5), and (6) Unesco Statistical Yearbook.
(7) Calculated by multiplying unit cost (Table 4) times number of years to produce one graduate.
(8) Calculated by multiplying unit cost times number of years of primary education.

Date: October 24, 1983

TYPICAL PATTERN OF TEACHER UTILIZATION IN SECONDARY EDUCATION,

AND MORE EFFICIENT ALTERNATIVES, EAST AFRICA

	Typical Pattern 1/	Alternatives			
		(A) Additional Teaching Load		(B) More Students per Class	(A + B)
		a.1 More Teaching Periods	a.2 Longer Teaching Periods		
Number of Student Periods per Week	40	40	32	40	40 or 32
Length of Periods in Minutes	40	40	50	40	40 or 50
Total Number of School Hours	26 2/3	26 2/3	26 2/3	26 2/3	26 2/3
Average Number of Teaching Periods per Teacher	24	30	24	24	30 or 24
Average Number of Teaching Hours per Teacher	16	20	20	16	20
Average Class Size	35	35	35	40	40
Average Student Teacher Ratio	21:1	26:1	26:1	24:1	30:1

1/ This is the pattern of teaching in all East Africa countries, with the exception of Comoros, Ethiopia, Zaire, and Kenya, which have student teacher ratios of 27:1 or above.

ANNEX I
Table 15

LENGTH AND COST OF SECONDARY
TEACHER TRAINING PROGRAMS IN SEVEN COUNTRIES,
IN SOUTHERN AFRICA, 1981

	Diploma Programs			Degree Programs		
	Length of Program in Years	Cost per Year (US$)	Total Cost per Graduate (US$)	Length of Program in Years	Cost per Year (US$)	Total Cost per Graduate (US$)
Botswana	2	1,038	2,076	4	3,957	15,828
Lesotho	3	1,242	3,726	4	4,747	18,988
Malawi	3	3,556	10,668	5	3,556	17,780
Swaziland	2	1,610	3,220	3	2,554	7,662
Tanzania	2	1,170	2,340	4	7,702	31,128
Zambia	2	726	1,452	4	3,117	12,468
Zimbabwe	3	2,600	7,800	4	8,500	34,000

Source: «Teacher Training and Teacher Educators in Southern Africa», report to the SADCC Regional Training Council, R. Duberg and A. Gorham, Mbabane, Swaziland, 1983.

UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS

IN SECONDARY EDUCATION, EASTERN AFRICA

	Day Schools	Boarding Schools	Community Junior Secondary Schools	Government Aided Schools
BOTSWANA (1982)				
Government's Unit Cost	P751	P789	P134	P415
Student Cost				
Tuition	20	20	200	20
Uniforms	10	10	10	10
Books and Supplies	35	35		35
Examination Fees	5	5	5	
Room and Board	12	60		
Total Student Cost (as a % of Total Cost)	82 (9.8)	130 (14.1)	215 (61.6)	P65 (13.5)
Total Costs	833	919	349	480
Source: USAID Sector Survey (1984)				

	Maintained and Assisted Schools	Assisted Harambee Schools
KENYA (1981-82)		
Government's Unit Cost	S2340	S413
Student Cost		
Fees	1820	1851
Total (As a % of Total Cost)	1820 (43.7)	1851 (80.7)
Total School Cost	4168	2294
Source: World Bank Study "The Economics of Financing Education - A Case Study of Kenya" (1984)		

UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS IN

EASTERN AFRICA

LESOTHO (1982)

	Day Schools	Boarding Schools
Government's Unit Cost	M254	M254
Student Cost		
Fees	163	275
Uniforms, Shoes	22	22
Total Student Cost	185	297
(As a % of Total Cost)	(42.1)	(53.9)
Total School Cost	439	551

Source: Government of Lesotho Sector Survey (1983)

MALAWI (1982)

	State Boarding Schools (Form IV)
Government's Unit Cost	K235
Student Cost	
School Fees	27
Boarding Fees	56
Other Fees	14
Books, Stationary	8
School Attire	37
Transport	56
Expenditures	23
Total Student Cost	221
(As a % of Total Cost)	(48.5)
Total School Cost	456

Source: World Bank Study "User Charges for Education: The Ability and Willingness to Pay in Malawi" (1984)

UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS

IN SECONDARY EDUCATION, EASTERN AFRICA

SOMALIA (1981-82)

	Day Schools	Boarding Schools
Government Unit Cost		
Teacher Salaries	S754	
Non Teacher Salaries	135	
Textbooks, Exercise Books	146	
Class Supplies	7	
Science, Workshop Supplies	18	
Maintenance, Repairs	8	
Sub-Total Government	1068	S1068
Salaries		143
Food		2160
Outline Books		110
Boarding		322
Total Government Cost	1068	3803
Student Cost	-0-	
Boarding Charges		450
(Total Student Cost as a % of Total Cost)	(0.0)	(10.6)
Total Cost	1068	4253
Source: USAID Sector Study (1983)		

SWAZILAND (1980)

	Lower Secondary Education	Upper Secondary Education
Governments' Unit Cost	E168	E280.2
Student Cost		
Fees	37.7	53.1
Books	38.4	39.4
Building	6.5	9.0
Total Student Cost	82.0	101.5
(as a % of Total Cost)	(32.8)	(26.6)
Total Cost	250.0	381.7
Source: Education Sector Review, 1981 "Education Financing in Swaziland", Government of Swaziland		

UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS

IN EASTERN AFRICA

TANZANIA (1980)

	Boarding Schools
Governments' Unit Cost	S6860
Student Cost	
Fees	0
School Books	131
Writing Supplies	109
School Equipment	107
Transport to School	151
School Uniforms	267
Boarding	204
Incidentals	171
Total Student Cost	1140
(As a % of Costs)	(14.3)
Total Cost	S8000
Source: World Bank Study, "The Private Direct Cost of Secondary Schooling in Tanzania" (1983)	

UGANDA (1981)

	Day Schools	Boarding Schools
Governments' Unit Cost	4095	4095
Student Cost		
Fees	1311	3496
Total Student Cost	1311	3496
(As a % of Total Cost)	(24.3)	(46.1)
Total Cost	5406	7591
Source: Unesco Sector Survey, (1982)		

UNIT COSTS FOR STUDENTS AND FOR GOVERNMENTS

IN EASTERN AFRICA

ZAMBIA (1980)

	Day Schools	Boarding Schools
Governments' Unit Cost	331	331
Student Cost		
Fees	38.5	38
Exercise Books, etc.	50	50
Uniforms, Shoes	90	90
Transportation	-	15
Total Student Cost	178.5	193
(As a % of Total Cost)	(35.0)	(36.8)
Total Cost	509.5	524
Source: MOE estimates provided to World Bank (1983)		

ENROLLMENT IN PUBLIC AND PRIVATE SECONDARY SCHOOLS,

EASTERN AFRICA

Country	Enrollment in Public Schools		Enrollment in Private Schools 1/		Total	Year of Data	Source
	Amount	% of Total	Amount	% of Total			
Botswana	14500	71	6020	29	20520	1982	USAID Sector Survey
Burundi	17570	94	1048	6	18618	1982	Government of Burundi, Statistiques Scolaires
Comoros	13628	100	0	0	13628	1981	World Bank Appraisal Report
Djibouti	5322	89	677	11	5999	1983	World Bank Sector Memorandum
Ethiopia	451674	93	35500	7	487174	1981	Ethiopian Government Sector Study of Ethiopian Education
Kenya	258119	63	152430	37	410549	1981	World Bank Financing Study
Lesotho							
Madagascar	129370	69	57694	31	18706	1978	Malgache Government
Malawi	16590	85	3000	15	18590	1982	World Bank Financing Study
Mauritius							
Rwanda							
Somalia	44860	100	0	0	44860	1982	USAID Sector Study
Sudan							
Swaziland							
Tanzania	35400	64	19800	36	55230	1980	Unesco Sector Study, 1981 (Forms I - IV)
Uganda	66730	75	21992	25	88722	1979	Unesco Sector Study, 1983
Zaire							
Zambia	9627	97	3270	3	94897	1980	Government of Zambia Data
Zimbabwe	316438	100	0	0	316428	1983	Government of Zimbabwe Data
Average		86		14			

1/ Private schools are defined as institutions which receive little or no financial assistance from government.

Date: July 10, 1984

ESTIMATED UNIT COSTS TO GOVERNMENTS OF HIGHER EDUCATION, EASTERN AFRICA

Country	Unit Cost		As a Multiple of GNP per capita 2/	Year of Data	Exchange Rate	Source
	Local Currency 1/	US Dollars				
Botswana	P7143	6572	6.5	1983	P=$.92	USAID Sector Study
Burundi	FB263772	2928	12.7	1983	FB=$.0111	Gv't of Burundi Data
Comoros	-	-	-	-	-	-
Djibouti	-	-	-	-	-	-
Ethiopia	B2850	1553	11.1	1982	B=$.545	Unesco Sector Study
Kenya	S31432	4149	9.9	1981	S=$.132	WB Financing Study
Lesotho	M6702	6167	11.4	1983	M=$.92	WB Financing Study
Madagascar	-	-	-	-	-	-
Malawi	K3448	3172	15.9	1981	K=$.92	WB Financing Study
Mauritius	R24378	3169	2.9	1979	R=$.13	WB Financing Study
Rwanda	FK285092	3079	14.0	1980	FR=$.011	WB Appraisal Report
Somalia	S13559 3/	895 3/	3.2	1983	S=$.066	USAID Sector Study
Sudan	LS1997	1533	4.3	1980	L=$.77	Gv't of Sudan Data
Swaziland	E2150	2472	3.6	1980	F=$1.15	Gv't of Swaziland Sector Study
Tanzania	S72171	8661	30.9	1982	S=$.12	WB Financing Study
Uganda	S231258	2313	10.5	1982	S=$.01	Uganda Sector Study
Zaire	-	-	-	-	-	-
Zambia	K3260	3750	6.3	1981	K=$1.15	WB Appraisal Report
Zimbabwe	Z$8030	11081	12.7	1981	Z$=$1.38	WB Sector Memo
Average		4099	10.4			

1/ Based on data from the national universtity rather than all post-secondary institution. Does not include value of expatriate teachers financed by external loans.

2/ 1981 Data on GNP per capita except Mauritius, 1979; Rwanda, 1980; Sudan, 1980; Swaziland 1980.

3/ Most higher education costs are paid by Italian Government.

Date: July 12, 1984.

STUDENT-TEACHER RATIOS

IN HIGHER EDUCATION INSTITUTIONS, EASTERN AFRICA

Country	Students per Teacher	Year of Data	Source
Botswana	8.8	1982	USAID Sector Survey
Burundi	7.1	1982	Government of Burundi Data
Comoros	-		
Djibouti	-		
Ethiopia	13.8	1979	Unesco Statistical Yearbook 1982
Kenya	7.1	1980	World Bank Financing Study
Lesotho	8.6	1982	World Bank Study on Financing of Education in Lesotho
Malawi	8.3	1982	World Bank Financing Study
Madagascar	-		
Mauritius	5.4	1979	World Bank Sector Study
Somalia	6.0	1983	USAID Sector Study
Sudan	3.8	1979	Unesco Statistical Yearbook, 1982
Swaziland	9.7	1979	Unesco Statistical Yearbook, 1982
Tanzania	3.8	1982	World Bank Financing Study
Uganda	-		
Zaire	-		
Zambia	-		
Zimbabwe	6.5	1979	Unesco Statistical Yearbook, 1982
Average	7.4		

Date: July 10, 1984

ANNEX I
Table 20

BREAKDOWN OF HIGHER EDUCATION COSTS AND

AMOUNT OF STIPENDS TO STUDENTS, EASTERN AFRICA

Country	Teaching Costs %	Student Room and Board %	Administration and Other Costs %	Yearly Stipend per Student		Source
				Amount in US$ 1/	of which Amount Returned for Room, Board, and Tuition	
Botswana				276	0	USAID Sector Survey
Burundi	24	23	54	935 2/	434	Gov't of Burundi Data
Comoros						
Djibouti						
Ethiopia	57					Unesco Sector Survey
Kenya	?	13	?	1373 2/	1373 (?)	WB Financing Study
Lesotho	27	17	56	1335 2/	322	WB Financing Study
Madagascar						
Malawi	34	10	56	197	18	WB Financing Study
Mauritius						
Rwanda						
Somalia						
Sudan	60	34	16	526	0	Gov't of Sudan Data
Swaziland						
Tanzania				720	0	WB Financing Study
Uganda						
Zaire						
Zambia						
Zimbabwe						
Average	40	19	41	766		

1/ Provided to all students except Lesotho 67%, Botswana 89%, and Burundi 75%
2/ In the form of loans in Kenya, Burundi, and Lesotho

Date: July 12, 1984

ANNEX II

PRIMARY ENROLLMENT TEACHER AND COST PROJECTIONS BY COUNTRY

BASED ON DIFFERING FERTILITY ASSUMPTIONS

The following pages provide projections by country of primary level enrollments and costs through the year 2015. Alternative projections are based on: (a) continuation of present enrollment ratios (Option A) or achievement of 98% enrollment ratio by the year 2000 (Option B); and (b) alternative fertility assumptions including: (i) constant fertility; (ii) moderate fertility decline, and (iii) rapid fertility decline along the lines of countries such as Singapore and the Republic of Korea. The population projections with alternative fertility assumptions were provided by the Population, Health, and Nutrition Department of the World Bank. The projection assumes no changes in unit costs and student-teacher ratios.

VARIABLES PER COUNTRY

Country	Enrollment Ratio	Student-Teacher Ratio	Cost per Student (in Local Currency)	School Age Population	Population Growth Rate (1980)
Botswana	94	32	123.00	6-12	3.5
Burundi	29	37	4775.00	6-11	2.8
Comoros	99	45	1081.00	6-11	3.0
Ethiopia	38	59	56.00	6-11	2.9
Kenya	92	40	400.00	5-11	4.3
Lesotho	116	48	39.40	6-12	2.8
Madagascar	94	47	-	6-11	2.9
Malawi	62	65	13.60	6-13	3.3
Mauritius	99	22	896.00	5-10	0.6
Rwanda	70	40	2570.00	7-14	3.4
Somalia	22	29	416.00	6-13	2.3
Sudan	51	34	55.70	7-12	2.9
Swaziland	79	34	60.00	6-12	3.8
Tanzania	98	43	284.90	7-13	3.2
Uganda	54	34	569.00	6-12	3.2
Zaire	84	42	-	6-11	3.0
Zambia	95	48	62.00	7-13	3.4
Zimbabwe	90	39	98.80	7-13	4.2

[illegible] 10/1988

CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's) 1/	U P E by Year 2000 Option B (000's) 2/	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
bur	1980	4114	637	184	184	5000	5000	882 08	100	882 08	100
bur	1985	4720	745	216	344	5800	9300	1031 63	116	1645 27	186
bur	1990	5479	905	262	574	7100	15500	1253 19	142	2744 04	311
bur	1995	6380	1094	317	883	8600	23900	1514 91	171	4218 23	478
bur	2000	7435	1281	371	1255	10000	33900	1773 86	201	5994 43	679
bur	2005	8703	1476	428	1446	11600	39100	2043 89	231	6906 94	783
bur	2010	10260	1726	500	1691	13500	45700	2390 07	270	8076 61	915
bur	2015	12191	2069	600	2027	16200	54800	2865 04	324	9681 88	1097

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
bur	1980	4114	637	184	184	5000	5000	882 08	100	882 08	100
bur	1985	4720	852	247	394	6700	10700	1179 88	133	1881 58	213
bur	1990	5479	1033	299	655	8100	17700	1430 88	162	3132 16	355
bur	1995	6380	1251	362	1010	9800	27300	1732 33	196	4823 40	546
bur	2000	7345	1470	426	1440	11500	38900	2035 88	230	6878 86	779
bur	2005	8405	1638	475	1605	12800	43400	2268 22	257	7665 02	868
bur	2010	9576	1759	510	1723	13800	46600	2435 77	276	8231 24	933
bur	2015	10843	1944	563	1905	15200	51500	2691 95	305	9096 94	1031

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
bur	1980	4114	637	184	184	5000	5000	882 08	100	882 08	100
bur	1985	4720	745	216	344	5800	9300	1031 63	116	1645 27	186
bur	1990	5322	905	262	574	7100	15500	1253 19	142	2744 04	311
bur	1995	5865	994	288	802	7800	21700	1376 44	156	3832 45	434
bur	2000	6311	932	270	913	7300	24700	1290 58	146	4361 29	494
bur	2005	6633	853	247	835	6700	22600	1181 19	133	3991 61	452
bur	2010	7028	724	209	709	5700	19200	1002 55	113	3387 95	384
bur	2015	7464	712	206	697	5600	18900	985 94	111	3331 88	377

1/ Option A: Continuation of present enrollment ratios
2/ Option B: 98% enrollment ratio by the year 2000

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
Bot	1980	981	175	164	164	5100	5100	30 23	100	30 23	100
Bot	1985	1072	209	196	198	6100	6300	34 16	119	34 43	120
Bot	1990	1290	259	243	248	7600	7800	39 94	148	38 58	151
Bot	1995	1563	329	309	319	9700	10000	38 03	188	39 25	194
Bot	2000	1904	396	372	388	11600	12100	43 78	236	47 73	235
Bot	2005	2331	484	456	476	14300	14900	56 19	277	58 38	289
Bot	2010	2844	599	563	587	17600	18300	69 35	342	71 30	356
Bot	2015	3528	741	696	726	21800	22700	85 47	433	89 33	441

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
Bot	1980	981	175	164	164	5100	5100	30 23	100	30 23	100
Bot	1985	1073	209	196	198	6100	6300	34 16	119	34 43	120
Bot	1990	1290	259	243	248	7600	7800	39 94	148	38 58	151
Bot	1995	1563	329	309	319	9700	10000	38 03	188	39 25	194
Bot	2000	1862	396	372	388	11600	12100	43 78	236	47 73	235
Bot	2005	2178	459	431	449	13500	14100	53 86	263	55 33	273
Bot	2010	2487	484	454	474	14300	14800	55 96	276	58 34	288
Bot	2015	3006	496	466	484	14600	15200	57 34	283	59 78	295

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
Bot	1980	981	175	164	164	5100	5100	30 23	100	30 23	100
Bot	1985	1073	209	196	198	6100	6300	34 16	119	34 43	120
Bot	1990	1247	259	243	248	7600	7800	39 94	148	38 58	151
Bot	1995	1417	300	282	291	8800	9100	34 48	171	35 79	176
Bot	2000	1568	286	268	280	8400	8800	33 06	163	34 47	170
Bot	2005	1690	274	257	268	8000	8400	31 47	156	33 02	163
Bot	2010	1833	239	224	234	7000	7300	27 63	136	28 80	142
Bot	2015	1988	234	219	229	6900	7200	27 05	133	28 20	139

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
com	1980	347	57	56	56	1300	1300	61 00	100	61 00	100
com	1985	403	68	67	67	1500	1500	72 77	119	72 58	118
com	1990	472	81	80	79	1800	1800	86 68	142	86 24	141
com	1995	555	95	94	93	2100	2100	101 66	166	100 88	165
com	2000	655	113	111	110	2500	2500	120 93	198	119 70	196
com	2005	779	135	133	132	3000	2900	144 47	236	143 01	234
com	2010	932	163	161	159	3600	3500	174 44	285	172 67	283
com	2015	1131	198	196	194	4400	4300	211 89	347	209 75	343

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
com	1980	347	57	56	56	1300	1300	61 00	100	61 00	100
com	1985	403	68	67	67	1500	1500	72 77	119	72 58	118
com	1990	472	81	80	79	1800	1800	86 68	142	86 24	141
com	1995	555	95	94	93	2100	2100	101 66	166	100 88	165
com	2000	646	113	111	110	2500	2500	120 93	198	119 70	196
com	2005	744	129	127	126	2800	2800	138 05	226	136 66	224
com	2010	849	139	137	136	3100	3000	148 75	243	147 35	241
com	2015	954	150	148	147	3300	3300	160 52	263	158 90	260

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
com	1980	347	57	56	56	1300	1300	61 00	100	61 00	100
com	1985	403	68	67	67	1500	1500	72 77	119	72 58	118
com	1990	457	81	80	79	1800	1800	86 68	142	86 24	141
com	1995	504	85	84	83	1900	1900	90 96	149	90 27	147
com	2000	542	79	78	77	1700	1700	84 54	138	83 69	137
com	2005	573	72	71	70	1600	1600	77 05	126	76 27	125
com	2010	609	62	61	60	1400	1400	66 35	108	65 68	107
com	2015	649	65	64	63	1400	1400	69 56	114	68 85	113

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CONSTANT FERTILITY

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U.P.E. by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
eth	1980	31065	5164	1963	1963	33300	33300	109.88	100	109.88	100
eth	1985	35949	6053	2300	3208	39000	54400	128.80	117	179.45	163
eth	1990	41896	7058	2682	4799	45500	81300	150.19	136	268.74	244
eth	1995	49126	8346	3171	6937	53800	117400	177.60	161	387.93	353
eth	2000	57946	9969	3788	9769	64200	165600	212.14	193	547.09	497
eth	2005	68809	11934	4534	11695	76900	198200	253.95	231	654.93	595
eth	2010	83280	14417	5478	14128	92900	239500	306.79	279	791.20	719
eth	2015	99067	17545	6674	17213	113100	291800	373.78	340	963.96	877

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U.P.E. by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
eth	1980	31065	5164	1963	1963	33300	33300	109.88	100	109.88	100
eth	1985	35949	6053	2300	3208	39000	54400	128.80	117	179.45	163
eth	1990	41896	7058	2682	4799	45500	81300	150.19	136	268.74	244
eth	1995	49126	8346	3171	6937	53800	117400	177.60	161	387.93	353
eth	2000	57252	9969	3788	9769	64200	165600	212.14	193	547.09	497
eth	2005	66383	11489	4365	11239	74000	190800	244.48	222	630.51	573
eth	2010	76561	12751	4845	12495	83100	211800	271.34	246	699.77	636
eth	2015	87638	14371	5432	13985	91900	237000	303.48	276	783.19	712

RAPID FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U.P.E. by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
eth	1980	31065	5164	1963	1963	33300	33300	109.88	100	109.88	100
eth	1985	35949	6053	2300	3208	39000	54400	128.80	117	179.45	163
eth	1990	40591	7058	2682	4799	45500	81300	150.19	136	268.74	244
eth	1995	44811	7521	2857	6342	48400	105800	160.04	145	349.57	318
eth	2000	48303	7046	2677	6905	45400	117000	149.93	136	386.69	351
eth	2005	50845	6554	2490	6432	42200	108900	139.46	126	359.68	327
eth	2010	53930	5596	2126	5484	36000	93000	119.08	108	307.10	279
eth	2015	57281	5529	2101	5418	35600	91800	117.65	107	303.43	276

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CONSTANT FERTILITY

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
ken	1980	16443	3533	3250	3250	81300	81300	1300 14	100	1300 14	100
ken	1985	20579	4715	4337	4408	108400	110200	1735 13	133	1763 40	135
ken	1990	25584	6011	5530	5718	138300	142800	2212 84	170	2284 18	175
ken	1995	32016	7419	6825	7159	170600	179000	2730 19	209	2863 73	220
ken	2000	40402	9371	8621	9183	215500	229600	3448 52	265	3673 43	282
ken	2005	51291	11978	11012	11730	275300	293300	4404 94	338	4692 24	360
ken	2010	65358	15416	14182	15107	354600	377700	5673 08	436	6043 87	464
ken	2015	83485	19770	18188	19374	454700	484400	7275 34	559	7749 84	596

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
ken	1980	16443	3533	3250	3250	81300	81300	1300 14	100	1300 14	100
ken	1985	20579	4715	4337	4408	108400	110200	1735 13	133	1763 40	135
ken	1990	25584	6011	5530	5718	138300	142800	2212 84	170	2284 18	175
ken	1995	32026	7419	6825	7159	170600	179000	2730 19	209	2863 73	220
ken	2000	39552	9371	8621	9183	215500	229600	3448 52	265	3673 43	282
ken	2005	48068	11129	10238	10904	256000	272700	4095 47	315	4362 56	335
ken	2010	57134	12533	11530	12282	288300	307100	4612 14	354	4912 93	377
ken	2015	65878	13639	12547	13366	313700	334200	5019 15	384	5346 48	411

RAPID FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
ken	1980	16443	3533	3250	3250	81300	81300	1300 14	100	1300 14	100
ken	1985	20579	4715	4337	4408	108400	110200	1735 13	133	1763 40	135
ken	1990	24817	6011	5530	5718	138300	142800	2212 84	170	2284 18	175
ken	1995	29341	6666	6132	6432	153300	160800	2453 08	188	2573 07	197
ken	2000	34034	7823	6461	6882	161500	172100	2584 46	198	2753 01	211
ken	2005	38586	7388	6796	7240	169900	181000	2718 78	209	2896 09	222
ken	2010	42397	7358	6769	7210	169200	180300	2707 74	208	2884 33	221
ken	2015	46218	6597	6069	6465	151700	161600	2427 49	186	2586 03	198

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CONSTANT FERTILITY

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
les	1980	1341	234	371	371	5700	5700	10.49	100	10.49	100
les	1985	1539	273	316	304	6600	6300	13.47	114	11.99	113
les	1990	1775	326	378	348	7900	7300	14.89	139	13.74	128
les	1995	2058	396	459	405	9600	8500	18.09	169	15.99	149
les	2000	2404	457	530	447	11000	9300	20.88	195	17.44	164
les	2005	2836	565	633	534	13200	11100	24.98	233	21.04	196
les	2010	3344	654	758	640	15800	13400	29.89	279	25.25	236
les	2015	4014	798	916	774	19100	16100	36.10	337	30.50	285

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
les	1980	1341	234	371	371	5700	5700	10.49	100	10.49	100
les	1985	1539	273	316	304	6600	6300	13.47	114	11.99	113
les	1990	1775	326	378	348	7900	7300	14.89	139	13.74	128
les	1995	2058	396	459	405	9600	8500	18.09	169	15.99	149
les	2000	2368	457	530	447	11000	9300	20.88	195	17.44	164
les	2005	2708	532	605	511	13600	10700	23.85	223	20.15	188
les	2010	3065	559	648	547	13500	11400	25.54	238	21.58	201
les	2015	3416	559	648	547	13500	11400	25.54	238	21.58	201

RAPID FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
les	1980	1341	234	371	371	5700	5700	10.49	100	10.49	100
les	1985	1539	273	316	304	6600	6300	13.47	114	11.99	113
les	1990	1716	326	378	348	7900	7300	14.89	139	13.74	128
les	1995	1865	358	415	366	8700	7600	16.36	152	14.45	135
les	2000	1976	314	364	307	7600	6400	14.35	134	12.12	113
les	2005	2091	276	328	270	6700	5600	12.61	117	10.65	99
les	2010	2230	250	298	245	6000	5100	11.42	106	9.65	90
les	2015	2373	287	332	281	6900	5900	13.11	122	11.08	103

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mad	1980	8714	1458	1370	1370	29200	29200	0 00	0	0 00	0
mad	1985	10068	1692	1590	1607	33800	34200	0 00	0	0 00	0
mad	1990	11742	1988	1868	1908	39800	40600	0 00	0	0 00	0
mad	1995	13801	2355	2213	2284	47100	48600	0 00	0	0 00	0
mad	2000	16324	2836	2665	2779	56700	59100	0 00	0	0 00	0
mad	2005	19435	3407	3202	3338	68100	71000	0 00	0	0 00	0
mad	2010	23300	4112	3865	4029	82200	85700	0 00	0	0 00	0
mad	2015	28129	5005	4704	4904	100100	104400	0 00	0	0 00	0

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mad	1980	8714	1474	1575	1575	33500	33500	0 00	0	0 00	0
mad	1985	10068	1938	1821	1841	38800	39200	0 00	0	0 00	0
mad	1990	11742	2278	2141	2186	45600	46500	0 00	0	0 00	0
mad	1995	13801	2698	2536	2617	54000	55700	0 00	0	0 00	0
mad	2000	16072	3246	3051	3181	64900	67700	0 00	0	0 00	0
mad	2005	18549	3739	3514	3664	74800	78000	0 00	0	0 00	0
mad	2010	21190	4052	3808	3970	81000	84500	0 00	0	0 00	0
mad	2015	23847	4384	4120	4296	87700	91480	0 00	0	0 00	0

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mad	1980	8714	1458	1370	1370	29200	29200	0 00	0	0 00	0
mad	1985	10068	1692	1590	1607	33800	34200	0 00	0	0 00	0
mad	1990	11373	1988	1868	1908	39800	40600	0 00	0	0 00	0
mad	1995	12569	2121	1993	2057	42400	43832	0 00	0	0 00	0
mad	2000	13562	1999	1879	1959	40000	41700	0 00	0	0 00	0
mad	2005	14311	1859	1747	1821	37200	38800	0 00	0	0 00	0
mad	2010	15223	1595	1499	1563	31900	33300	0 00	0	0 00	0
mad	2015	16221	1591	1495	1559	31800	33200	0 00	0	0 00	0

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mal	1980	6037	1201	744	744	11500	11500	10.13	100	10.13	100
mal	1985	7129	1576	977	1118	15000	17200	13.38	131	15.21	150
mal	1990	8393	1924	1192	1539	18400	23700	16.32	160	20.93	206
mal	1995	9957	2392	1483	2128	22800	32800	20.16	199	28.95	285
mal	2000	11976	2757	1709	2701	26300	41600	23.24	229	36.74	362
mal	2005	14597	3397	2106	3329	32400	51200	28.64	282	45.27	447
mal	2010	17948	4276	2651	4190	40800	64500	36.05	356	56.99	563
mal	2015	22208	5406	3351	5297	51600	81500	45.58	450	72.05	711

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mal	1980	6037	1201	744	744	11500	11500	10.13	100	10.13	100
mal	1985	7129	1576	977	1118	15000	17200	13.38	131	15.21	150
mal	1990	8393	1924	1192	1539	18400	23700	16.32	160	20.93	206
mal	1995	9957	2392	1483	2128	22800	32800	20.16	199	28.95	285
mal	2000	11794	2757	1709	2701	26300	41600	23.24	229	36.74	362
mal	2005	13937	3282	2034	3214	31300	49500	27.67	273	43.74	431
mal	2010	16328	3774	3339	3698	36000	56900	31.82	314	50.29	496
mal	2015	18857	4298	2664	4212	41000	64800	36.24	357	57.28	565

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mal	1980	6037	1201	744	744	11500	11500	10.13	100	10.13	100
mal	1985	7129	1576	977	1118	15050	17200	13.38	131	15.21	150
mal	1990	8153	1924	1192	1539	18400	33700	16.32	160	20.93	206
mal	1995	9153	2242	1390	1995	21400	30700	18.90	186	27.13	267
mal	2000	10132	2148	1331	2105	20500	32400	18.11	178	28.62	281
mal	2005	11016	2168	1344	2124	20700	32700	18.28	180	28.89	285
mal	2010	11654	2108	1306	2065	20100	31800	17.77	175	28.09	277
mal	2015	12385	1888	1170	1850	18000	28500	15.91	157	25.16	248

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mau	1980	957	125	123	123	5600	5600	110.88	100	110.88	100
mau	1985	1055	140	138	138	6300	6300	124.18	112	123.87	111
mau	1990	1167	151	149	148	6800	6800	133.94	120	133.24	120
mau	1995	1283	164	162	161	7400	7300	145.67	131	144.37	130
mau	2000	1400	177	175	173	8000	7900	157.00	141	155.42	140
mau	2005	1513	181	179	177	8100	8100	160.53	144	158.93	143
mau	2010	1650	190	188	186	8600	8500	168.53	152	166.83	150
mau	2015	1785	203	199	197	9100	9000	179.18	161	177.37	159

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mau	1980	957	125	123	123	5600	5600	110.88	100	110.88	100
mau	1985	1055	140	138	138	6300	6300	124.18	112	123.87	111
mau	1990	1158	151	149	148	6800	6800	133.94	120	133.24	120
mau	1995	1255	155	153	152	7000	6900	137.49	124	136.44	123
mau	2000	1346	154	154	152	7000	6900	138.37	124	136.98	123
mau	2005	1431	150	148	147	6800	6700	133.05	120	131.71	118
mau	2010	1510	147	145	144	6600	6500	130.39	117	129.07	116
mau	2015	1588	145	143	142	6500	6500	128.62	116	127.33	114

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
mau	1980	957	125	123	123	5600	5600	110.88	100	110.88	100
mau	1985	1055	140	138	138	6300	6300	124.18	112	123.87	111
mau	1990	1136	151	149	148	6800	6800	133.94	120	133.24	120
mau	1995	1218	134	132	131	6000	6000	118.84	107	117.95	106
mau	2000	1299	132	130	129	5900	5900	117.06	105	115.90	104
mau	2005	1378	139	137	136	6300	6200	123.29	111	122.05	110
mau	2010	1454	140	138	137	6300	6200	124.18	112	122.93	110
mau	2015	1524	141	139	138	6300	6300	125.07	113	123.80	111

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CONSTANT FERTILITY

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
rwa	1980	5148	1053	734	734	18400	18400	1892.54	100	1892.54	100
rwa	1985	6134	1331	861	947	21500	23700	2214.56	117	2436.02	128
rwa	1990	7330	1562	1093	1312	27300	32800	2810.03	148	3372.04	178
rwa	1995	8793	1986	1390	1807	34800	45200	3572.81	188	4644.65	245
rwa	2000	10568	2420	1694	2371	42400	59300	4353.58	230	6095.01	322
rwa	2005	12769	2980	2086	2842	52200	71100	5217.18	275	7303.94	385
rwa	2010	15558	3498	2448	3428	61200	85700	6292.90	332	8810.06	465
rwa	2015	19131	4305	3013	4218	75300	105500	7744.69	409	10842.57	572

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
rwa	1980	5148	1053	734	734	18400	18400	1892.54	100	1892.54	100
rwa	1985	6134	1331	861	947	21500	23700	2214.56	117	2436.02	128
rwa	1990	7330	1562	1093	1312	27300	32800	2810.03	148	3372.04	178
rwa	1995	8793	1986	1390	1807	34800	45200	3572.81	188	4644.65	245
rwa	2000	10488	2420	1694	2371	42400	59300	4353.58	230	6095.01	322
rwa	2005	12201	2837	1985	2780	49600	69500	5103.74	269	7145.36	377
rwa	2010	14179	3139	2197	3076	54900	76900	5647.04	298	7905.88	417
rwa	2015	16412	3484	2438	3414	61000	85400	6247.71	331	8774.80	463

RAPID FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
rwa	1980	5148	1053	734	734	18400	18400	1892.54	100	1892.54	100
rwa	1985	6134	1331	861	947	21500	23700	2214.56	117	2436.02	128
rwa	1990	7130	1562	1093	1313	27300	32800	2810.03	148	3372.04	178
rwa	1995	8131	1909	1334	1737	33400	43400	3434.29	181	4464.57	235
rwa	2000	9148	1998	1398	1938	35000	49000	3594.48	189	5032.14	265
rwa	2005	10135	2044	1430	2003	35800	50100	3677.15	194	5148.01	271
rwa	2010	10985	2088	1461	2044	36500	51200	3756.31	198	5258.83	277
rwa	2015	11713	2027	1418	1984	35500	49700	3646.57	192	5105.20	269

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
som	1980	4272	884	194	194	4700	4700	81.08	100	81.08	100
som	1985	4791	1010	332	414	7700	14300	92.43	113	172.36	212
som	1990	5431	1115	245	449	8500	23100	102.04	125	278.30	343
som	1995	6175	1251	375	988	9500	34100	114.49	141	411.12	507
som	2000	7075	1466	333	1436	11100	49500	134.16	165	597.45	737
som	2005	8149	1694	373	1460	12900	57200	155.03	191	690.60	851
som	2010	9433	2013	441	1972	15300	68000	184.22	227	820.45	1012
som	2015	10985	2399	537	2351	18200	81100	219.55	270	978.02	1206

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
som	1980	4272	884	194	194	4700	4700	81.08	100	81.08	100
som	1985	4791	1010	332	414	7700	14300	92.43	113	172.36	212
som	1990	5431	1115	245	449	8500	23100	102.04	125	278.30	343
som	1995	6175	1251	375	988	9500	34100	114.49	141	411.12	507
som	2000	6995	1466	333	1436	11100	49500	134.16	165	597.45	737
som	2005	7874	1644	361	1611	12500	55600	158.45	195	670.33	826
som	2010	8809	1808	397	1771	13700	61100	165.44	204	737.08	909
som	2015	9778	1984	436	1944	15100	67000	181.57	223	808.83	997

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
som	1980	4272	884	194	194	4700	4700	81.08	100	81.08	100
som	1985	4791	1010	332	414	7700	14300	92.43	113	172.36	212
som	1990	5263	1115	245	449	8500	23100	102.04	125	278.30	343
som	1995	5668	1154	253	911	8800	31400	105.61	130	379.25	467
som	2000	5973	1087	239	1065	8200	34700	99.48	122	443.14	546
som	2005	6134	981	215	961	7400	33200	89.78	110	399.93	493
som	2010	6339	842	185	825	6400	28500	77.05	95	343.24	423
som	2015	6551	786	172	770	6000	26600	71.93	88	320.43	395

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CONSTANT FERTILITY

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
sud	1980	18681	2930	1494	1494	44000	44000	83 23	100	83 23	100
sud	1985	21549	3474	1771	2179	52100	64100	98 48	118	121 42	145
sud	1990	25003	4081	2081	3040	61200	89400	115 92	139	169 34	203
sud	1995	29178	4709	2401	4061	70600	119500	133 76	160	226 22	271
sud	2000	34241	5406	2859	5493	84100	161600	159 24	191	306 00	367
sud	2005	40301	6475	3404	6541	100100	192400	189 61	227	364 36	437
sud	2010	48195	8033	4096	7872	120500	231500	228 19	274	438 48	526
sud	2015	57721	9730	4962	9535	146000	280500	276 40	332	531 12	638

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
sud	1980	18681	2930	1494	1494	44000	44000	83 23	100	83 23	100
sud	1985	21549	3474	1771	2179	52100	64100	98 48	118	121 42	145
sud	1990	25003	4081	2081	3040	61200	89400	115 91	139	169 34	203
sud	1995	29178	4709	2401	4061	70600	119500	133 76	160	226 22	271
sud	2000	33745	5406	2859	5493	84100	161600	159 24	191	306 00	367
sud	2005	38743	6473	3301	6343	97100	186600	183 87	220	353 33	424
sud	2010	44056	7806	3973	6865	105100	201900	199 01	239	382 42	459
sud	2015	49440	7658	3901	7497	114800	220500	217 31	261	417 58	501

RAPID FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U P E by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
sud	1980	18681	2930	1494	1494	44000	44000	83 23	100	83 23	100
sud	1985	21549	3474	1771	2179	52100	64100	98 48	118	121 42	145
sud	1990	24286	4081	2081	3040	61200	89400	115 92	139	169 34	203
sud	1995	26817	4432	2260	3822	66500	112400	125 89	151	212 91	255
sud	2000	29088	4239	2161	4154	63600	123200	120 41	144	231 39	278
sud	2005	30806	4046	2073	3984	61000	117200	115 50	138	221 94	266
sud	2010	32906	3691	1883	3617	55400	106400	104 85	125	201 47	242
sud	2015	35138	3580	1825	3508	53700	103200	101 69	122	195 41	234

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
swa	1980	618	118	93	93	2700	2700	5.59	100	5.59	100
swa	1985	748	148	116	133	3400	3600	7.01	125	7.43	133
swa	1990	907	192	151	169	4500	5000	9.10	163	10.19	183
swa	1995	1103	334	184	218	5400	6400	11.09	198	13.09	234
swa	2000	1349	384	324	278	6600	8200	13.46	240	16.69	298
swa	2005	1662	350	274	343	8100	10100	16.59	296	20.58	367
swa	2010	2058	438	344	419	10300	12600	20.74	371	23.75	460
swa	2015	2559	350	434	539	12800	15900	24.97	466	33.34	578

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
swa	1980	618	118	93	93	2700	2700	5.59	100	5.59	100
swa	1985	748	148	116	133	3400	3600	7.01	125	7.43	133
swa	1990	907	192	151	169	4500	5000	9.10	163	10.19	183
swa	1995	1103	334	184	218	5400	6400	11.09	198	13.09	234
swa	2000	1324	384	324	278	6600	8200	13.46	240	16.69	298
swa	2005	1578	334	263	327	7800	9600	15.83	283	19.63	351
swa	2010	1830	349	291	361	8600	10600	17.49	313	21.69	387
swa	2015	2082	402	317	393	9300	11600	19.05	340	23.63	422

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
swa	1980	618	118	93	93	2700	2700	5.59	100	5.59	100
swa	1985	748	148	116	133	3400	3600	7.01	125	7.43	133
swa	1990	878	192	151	169	4500	5000	9.10	163	10.19	183
swa	1995	1004	215	169	208	5000	5900	10.19	182	13.02	215
swa	2000	1132	210	165	205	4900	6100	9.95	177	13.36	220
swa	2005	1220	207	163	202	4800	6000	9.81	175	13.17	217
swa	2010	1317	189	149	185	4400	5400	8.95	160	11.11	198
swa	2015	1436	193	151	188	4500	5500	9.10	163	11.28	201

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
tan	1980	18534	3567	3495	3495	81300	81300	995 91	100	995 91	100
tan	1985	21769	4245	4160	4160	96700	96700	1185 21	119	1185 21	119
tan	1990	25785	4780	4684	4684	108900	108900	1334 58	134	1334 58	134
tan	1995	30793	5959	5839	5839	135800	135800	1663 74	167	1663 74	167
tan	2000	36986	7201	7056	7056	164100	164100	2010 53	201	2010 53	201
tan	2005	44678	8822	8645	8645	201100	201100	2463 12	247	2463 12	247
tan	2010	54243	10731	10514	10514	244600	244600	2996 11	300	2996 11	300
tan	2015	66143	13115	12852	12852	298900	298900	3661 73	367	3661 73	367

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
tan	1980	18534	3567	3495	3495	81300	81300	995 91	100	995 91	100
tan	1985	21769	4245	4160	4160	96700	96700	1185 21	119	1185 21	119
tan	1990	25785	4780	4684	4684	108900	108900	1334 58	134	1334 58	134
tan	1995	30793	5959	5839	5839	135800	135800	1663 74	167	1663 74	167
tan	2000	36360	7201	7056	7056	164100	164100	2010 53	201	2010 53	201
tan	2005	42429	8574	8402	8402	195400	195400	2393 87	240	2393 87	240
tan	2010	48779	9359	9152	9152	212800	212800	2607 44	261	2607 44	261
tan	2015	54957	10052	9850	9850	229100	229100	2806 53	281	2806 53	281

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
tan	1980	18534	3567	3495	3495	81300	81300	995 91	100	995 91	100
tan	1985	21769	4245	4160	4160	96700	96700	1185 21	119	1185 21	119
tan	1990	24951	4780	4684	4684	108900	108900	1334 58	134	1334 58	134
tan	1995	27978	5432	5319	5319	128400	128400	1572 46	157	1572 46	157
tan	2000	30624	5444	5335	5335	124100	124100	1519 97	152	1519 97	152
tan	2005	32795	5264	5158	5158	120000	120000	1469 71	147	1469 71	147
tan	2010	33325	4710	4615	4615	107300	107300	1315 04	132	1315 04	132
tan	2015	38035	4435	4344	4344	101100	101100	1238 26	124	1238 26	124

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
uga	1980	12630	3553	1378	1378	40500	40500	777 54	100	777 54	100
uga	1985	14860	3988	1613	1942	47500	57100	910 03	117	1095 40	140
uga	1990	17673	3522	1901	2676	55900	78700	1072 66	137	1509 67	194
uga	1995	21199	4314	2329	3753	68500	110400	1313 87	168	2116 79	272
uga	2000	25583	5306	2865	5199	84300	152900	1615 99	207	2932 73	377
uga	2005	31046	6515	3518	6384	103500	187800	1984 30	255	3600 97	463
uga	2010	37930	7995	4317	7835	127000	230400	2434 95	313	4418 99	569
uga	2015	46436	9891	5341	9693	157100	285100	3012 40	387	5466 95	703

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
uga	1980	12630	3553	1378	1378	40500	40500	777 54	100	777 54	100
uga	1985	14860	3988	1613	1942	47500	57100	910 03	117	1095 40	140
uga	1990	17672	3522	1901	2674	55900	78700	1072 66	137	1509 47	194
uga	1995	21199	4314	2329	3753	68500	110400	1313 87	168	2116 79	272
uga	2000	25144	5306	2865	5199	84300	152900	1615 99	207	2932 73	377
uga	2005	29465	6333	3365	6188	99000	179700	1898 33	244	3445 18	443
uga	2010	34879	6828	3687	6691	108400	194800	2079 53	267	3773 97	485
uga	2015	38724	7430	4013	7281	118000	214300	2262 88	291	4106 70	528

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
uga	1980	12630	3553	1378	1378	40500	40500	777 54	100	777 54	100
uga	1985	14860	3988	1613	1942	47500	57100	910 03	117	1095 40	140
uga	1990	17113	3522	1901	2676	55900	78700	1072 66	137	1509 67	194
uga	1995	19314	3960	2138	3445	62900	101300	1206 05	155	1943 09	249
uga	2000	21308	3936	2128	3847	63400	113200	1195 70	153	2169 97	279
uga	2005	22874	3854	2081	3776	61200	111100	1173 77	150	2130 18	273
uga	2010	24561	3458	1867	3388	54900	99700	1053 16	135	1911 30	245
uga	2015	26418	3245	1752	3180	51500	93500	988 29	127	1793 57	230

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
ZAI	1980	28893	4788	4031	4031	95800	95800	0 00	0	0 00	0
ZAI	1985	33593	5799	4871	5074	116000	120800	0 00	0	0 00	0
ZAI	1990	39276	6659	5593	6059	133200	144300	0 00	0	0 00	0
ZAI	1995	46254	7884	6622	7450	157700	177400	0 00	0	0 00	0
ZAI	2000	54877	9450	7938	9261	189000	220500	0 00	0	0 00	0
ZAI	2005	65533	11459	9635	11229	229200	267400	0 00	0	0 00	0
ZAI	2010	78747	13928	11699	13649	278400	325000	0 00	0	0 00	0
ZAI	2015	93074	16912	14206	16573	338200	394600	0 00	0	0 00	0

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
ZAI	1980	28893	4788	4031	4031	95800	95800	0 00	0	0 00	0
ZAI	1985	33593	5799	4871	5074	116000	120800	0 00	0	0 00	0
ZAI	1990	39276	6659	5593	6059	133200	144300	0 00	0	0 00	0
ZAI	1995	46254	7884	6622	7450	157700	177400	0 00	0	0 00	0
ZAI	2000	53984	9450	7938	9261	189000	220500	0 00	0	0 00	0
ZAI	2005	62365	10881	9140	10643	217600	253900	0 00	0	0 00	0
ZAI	2010	71147	11732	9854	11497	234600	273700	0 00	0	0 00	0
ZAI	2015	79663	13503	10501	12251	250000	291700	0 00	0	0 00	0

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
ZAI	1980	28893	4788	4031	4031	95800	95800	0 00	0	0 00	0
ZAI	1985	33593	5799	4871	5074	116000	120800	0 00	0	0 00	0
ZAI	1990	37997	6459	5593	6059	133200	144300	0 00	0	0 00	0
ZAI	1995	41971	7068	5937	6679	141400	159000	0 00	0	0 00	0
ZAI	2000	45222	6517	5474	6386	130300	152100	0 00	0	0 00	0
ZAI	2005	48274	6813	5050	5892	120300	140300	0 00	0	0 00	0
ZAI	2010	51819	5509	4637	5398	110200	128500	0 00	0	0 00	0
ZAI	2015	55521	5971	5015	5851	119400	139300	0 00	0	0 00	0

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ZAMBIA

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CONSTANT FERTILITY

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
sam	1980	5647	1095	1040	1040	31700	31700	64.49	100	64.49	100
sam	1985	6694	1309	1243	1253	35900	36100	77.10	119	77.70	120
sam	1990	7979	1570	1491	1515	31100	31600	92.47	143	93.93	145
sam	1995	9558	1869	1775	1817	37000	37900	110.08	170	113.49	174
sam	2000	11513	2271	2157	2225	44900	46400	133.74	207	137.98	213
sam	2005	13947	2763	2624	2707	54700	56400	162.74	252	167.87	260
sam	2010	16998	3391	3221	3323	67100	69300	199.92	309	206.03	319
sam	2015	20807	4173	3963	4088	83600	85300	245.73	381	253.49	393

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U P E by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
sam	1980	5647	1095	1040	1040	31700	31700	64.49	100	64.49	100
sam	1985	6694	1309	1243	1253	35900	36100	77.10	119	77.70	120
sam	1990	7979	1570	1491	1515	31100	31600	92.47	143	93.93	145
sam	1995	9558	1869	1775	1817	37000	37900	110.08	170	113.49	174
sam	2000	11312	2271	2157	2225	44900	46400	133.74	207	137.98	213
sam	2005	13225	2684	2549	2636	53100	54800	158.08	245	163.07	253
sam	2010	15241	2946	2798	2887	58300	60100	173.51	269	178.99	277
sam	2015	17197	3187	3027	3123	63100	65100	187.71	291	193.64	300

RAPID FERTILITY DECLINE

Country	Year	Total Population (000's)	School-Age Population (000's)	Constant Enrollment Ratio Option A (000's)	U.P.E. by Year 2000 Option B (000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A (000,000's of Local Currency)		Government Expenses Option B (000,000's of Local Currency)	
sam	1980	5647	1095	1040	1040	31700	31700	64.49	100	64.49	100
sam	1985	6694	1309	1243	1253	35900	36100	77.10	119	77.70	120
sam	1990	7724	1570	1491	1515	31100	31600	92.47	143	93.93	145
sam	1995	8708	1770	1681	1721	35000	35900	104.35	161	106.72	165
sam	2000	9583	1744	1656	1709	34500	35600	102.72	159	105.96	164
sam	2005	10354	1693	1608	1659	33500	34600	99.71	154	102.86	159
sam	2010	11050	1526	1449	1495	30200	31200	89.88	139	92.71	143
sam	2015	11913	1379	1310	1351	27300	28200	81.22	125	83.78	129

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CONSTANT FERTILITY

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U.P.E. by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
zim	1980	6894	1369	1232	1232	31400	31400	131.73	100	131.73	100
zim	1985	8508	1783	1603	1639	41100	42000	158.45	120	161.97	123
zim	1990	10575	2182	1963	2051	50400	52400	194.82	148	202.64	154
zim	1995	13235	2773	2495	2642	64000	68300	246.57	187	263.01	200
zim	2000	16482	3521	3168	3450	81300	88500	313.88	238	340.91	259
zim	2005	21123	4498	4048	4408	103800	113000	399.96	304	435.51	331
zim	2010	26861	5741	5166	5634	132500	144300	510.48	388	555.86	422
zim	2015	34273	7339	6605	7192	169400	184400	651.58	495	710.59	540

INTERMEDIATE FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U.P.E. by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
zim	1980	6894	1342	1235	1235	31400	31400	131.88	100	131.88	100
zim	1985	8508	1783	1603	1639	41100	42000	158.45	120	161.97	123
zim	1990	10575	2182	1963	2051	50400	52400	194.82	148	202.64	154
zim	1995	13235	2773	2495	2642	64000	68300	246.57	187	263.01	200
zim	2000	16330	3521	3168	3450	81300	88500	313.88	238	340.91	259
zim	2005	19798	4358	3922	4270	100600	109500	387.51	294	421.95	320
zim	2010	23484	4930	4437	4831	113800	123900	438.37	333	477.34	362
zim	2015	27014	5442	4897	5333	125600	136700	483.98	367	526.91	400

RAPID FERTILITY DECLINE

Country	Year	Total Population ('000's)	School-Age Population ('000's)	Constant Enrollment Ratio Option A ('000's)	U.P.E. by Year 2000 Option B ('000's)	Number of Teachers Required (Option A)	Number of Teachers Required (Option B)	Government Expenses Option A ('000,000's of Local Currency)		Government Expenses Option B ('000,000's of Local Currency)	
zim	1980	6894	1369	1232	1232	31400	31400	131.73	100	131.73	100
zim	1985	8508	1783	1603	1639	41100	42000	158.45	120	161.97	123
zim	1990	10258	2182	1963	2051	50400	52600	194.82	148	202.64	154
zim	1995	12122	2648	2383	2542	61100	65300	235.46	178	251.15	191
zim	2000	14049	3038	2545	2771	65300	71100	251.46	191	273.81	208
zim	2005	15884	3030	2718	2959	69700	75900	268.53	204	292.48	222
zim	2010	17484	3058	2752	2994	70600	76800	271.91	206	294.58	224
zim	2015	18920	3854	3548	2794	45900	71700	253.77	193	274.33	208

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* World Bank, "The Economics of Financing Education: A Case Study of Kenya", by Trent J. Bertrand and Robert Griffin (draft), Washington, D.C., February 1984.

World Bank, "User Charges for Education: The Ability and Willingness to Pay in Malawi", by J.P. Tan, K.H. Lee, and A. Mingat, Staff Working Paper No. 661, Washington, D.C., 1984.

Papers marked with * are unpublished World Bank documents with restricted circulation.

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Alternative Routes to Formal Education: Distance Teaching for School Equivalency
Edited by Hilary Perraton

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The Johns Hopkins University Press, 1974; 3rd paperback printing, 1980. 310 pages (including 3 appendixes, references, index).

ISBN 0-8018-1601-7, Stock No. JH 1601. $10.95 paperback.

Spanish: La lucha contra la pobreza rural: el aporte de la educacion no formal. Editorial Tecnos, 1975.

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Spanish: Programas de formacion profesional: su evaluacion economica. Editorial Tecnos, 1977.

ISBN 84-309-0747-5, Stock No. IB 0536. $6.

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